ADAMS COUNTY

ALL HAZARDS MITIGATION PLAN

Adams County Emergency Management

Prepared by:
North Central Wisconsin Regional Planning Commission

ADAMS COUNTY ALL HAZARDS MITIGATION PLAN

prepared for:

Adams County Emergency Management Committee

by:

North Central Wisconsin Regional Planning Commission

adopted by Adams County Board on:

MARCH 16, 2004

This report was prepared at the request and under the supervision of the Adams County Emergency Management Committee and its Administrative Coordinator by the North Central Wisconsin Regional Planning Commission (NCWRPC). For more information, contact:

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Introduction

Part I of the Adams County All Hazard Mitigation Plan describes and documents the process used to develop the plan. This includes how it was prepared and who (committee, organizations, departments, staff, consultants, etc.) was involved in the planning process. It also describes the local governments involvement, the time period in which the plan was prepared, and who to contact to answer questions and make recommendations for future amendments to the plan.

Disaster Mitigation Act of 2000

The development of the Adams County All Hazard Mitigation Plan is a response to the passage of the Disaster Mitigation Act of 2000 (DMA2K). On October 30, 2000, DMA2K was signed into law by the U.S. Congress in an attempt to stem the losses from disasters, reduce future public and private expenditures, and to speed up response and recovery from disasters. This Act (Public Law 106-390) amended the Robert T. Stafford Relief and Emergency Assistance Act. The following is a summary of the parts of DMA2K that pertain to local governments and tribal organizations:

- The Act establishes a new requirement for local governments and tribal organizations to prepare an All-Hazard Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and Hazard Mitigation Grant Program.

- The Act establishes a requirement that natural hazards such as tornados, floods, wildfires need to be addressed in the risk assessment and vulnerability analysis parts of the All Hazard Mitigation Plan. Manmade such as hazardous waste spills is encouraged but not required to be addressed.

- The Act authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local, and tribal organization All Hazard Mitigation Plans.

- The Act establishes November 1, 2004 as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Grant Program and November 1, 2003 Pre-Disaster Mitigation Program.

- If a plan is not prepared by November 1, 2004, and a major disaster is declared, in order for a local government or tribal organization to

be eligible to receive funding through the Hazard Mitigation Grant Program, they must agree to prepare an All Hazards Mitigation Plan within one year.

- In addition, by not having an All Hazard Mitigation Plan, local governments and tribal organizations cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

Development of All Hazard Mitigation Plan

In October of 2002, the Adams County Emergency Management Department received an approved Planning Grant to develop an All Hazard Mitigation Plan through the Pre-Disaster Mitigation (PDM) Program).

In February of 2003, the North Central Wisconsin Regional Planning Commission (NCWRPC) began preparation of the All-hazards Mitigation Plan at the request of the County Emergency Management Department.

By September of 2003, the Adams County Emergency Management Committee had approved a draft plan for submission to Wisconsin Emergency Management (WEM) for review. The NCWRPC addressed WEM's comments, and a final plan was approved by the Adams County Board on March 16, 2004.

Five Parts of All Hazard Mitigation Plan

The Adams County All Hazard Mitigation Plan was categorized into five parts in order to address FEMA's local mitigation plan requirements. The five parts are as followed:

Part	I:	Planning Process
Part	II:	Planning Area
Part	III:	Risk Assessment
Part	IV:	Mitigation Strategy
Part	V:	Plan Mitigation Process and Adoption

All Hazard Mitigation Plan Taskforce

The Adams County All Hazard Mitigation Plan was prepared under the guidance of an advisory taskforce that consisted of the current five members of the County Emergency Management Committee. Periodic meetings were held with the NCWRPC staff, the County Emergency Management Coordinator, and the Committee Task Force to provide input on the types of hazards to be considered, appropriate mitigation strategies, and to review draft reports. Committee members are as follows:

1. Dean Morgan, Chair
2. Bob Eggebrecht
3. Bill Graumann
4. Dave Repinski
5. Judy Vondrak

Involvement From Local Governments

There were a number of opportunities for the local units of government to become involved in the planning process. In April of 2003, each town clerk, City mayor, and Village President in Adams County were sent surveys, see APPENDIX A, requesting which hazards are a concern, input on past and future mitigation measures, and to document other information that could be incorporated into the All Hazard Mitigation Plan.

On July 18, 2003, the planning process was formally introduced at a meeting with the mayor of the City of Adams and the Friendship Village president. The attendants at the meeting also provided information on hazards that have significance to the area and provided mitigation strategy ideas for the plan.

Also on July 18th, NCWRPC formally introduced the plan to the Adams County Towns Association at a meeting at the Rome Town Hall. A presentation was given describing the planning process and the hazards that were identified in the plan. Time was provided at the end of the presentation take comments and suggestions from the audience. Many of these comments and suggestions were incorporated into the planning document.

Neighboring Community Involvement

One of the requirements of the planning process was to include neighboring communities. With this requirement in mind, NCWRPC invited all county emergency management staff from surrounding counties to a meeting on August 16, 2003 at the Adams County Courthouse. Only the staff from Juneau County was present, however ideas were exchanged about All Hazard Mitigation planning processes between the two counties.

Local and Regional Agency Involvement

Another requirement of the planning process was to involve local and regional agencies in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-private interests. Meetings and phone interviews with county department staff, government agencies, and private businesses were done throughout the planning process. In

addition to this, the NCWRPC invited the following to a meeting on August 16, 2003 at Adams County Courthouse:

Drainage Board
Co. Planning & Zoning Dept.
Sheriff's Dept.
Oxford Prison
Adams Memorial Hospital
Fire Districts
School Districts
Co. Land and Water Department
Area Fertilizer Plants
University of Wisconsin-Extension
Wis. River and Power Co.
Community Programs Dept Co.
Social Services, & Aging Dept.
Public Health Dept.
Highway Dept.
Parks Dept.
Land Information Dept
Lake Districts
Friendship Ranger Station

During the meeting, the Plan and its components were introduced to the attendants. A summary of proposed mitigation strategies was given to each person present. Each mitigation measure was discussed in length with the group. Part IV of the Plan was revised based on the meeting.

Public Review Process

Opportunities for public comment were provided to review the Plan during the drafting stage and prior to Plan approval. All meetings were properly posted and open to the public. A copy of the draft was made available on the Adams County web site and at the Rome and Adams/Friendship Public Library. Comments and questions about the Plan were directed to the Adams County Emergency Department.

The plan was introduced and discussed at the Adams County Board Meeting of February 17, 2004. An opportunity for the general public to review and discuss the plan was provided prior to adoption at the Adams County Board Meeting of March 16, 2004. There was brief discussion by the Board, but no audience comment. The plan was unanimously approved by the Adams County Board on March 16, 2004.

Incorporated Plans, Studies, Reports, And Technical Data

Many plans, reports, and technical data were referenced and incorporated into the Adams County All Hazard Mitigation Plan. The following is comprehensive list of the data was used:

- 1993 Flood Recovery Plan by NCWRPC
- Adams County Emergency Operations Plan (October 2001)
- Adams County Hazardous Materials Response Plan (2002 update)
- Emergency Action Plan – Castle Rock (February 2001)
- Emergency Action Plan – Petenwell (February 2001)

- Emergency Action Plan for Lake Camelot, Lake Sherwood, and Lake Arrowhead (2003 update)
- Flood Insurance Study...for Adams County and Incorporated Areas (November 16, 1990)
- Hazard Analysis for the State of Wisconsin (November 2002)
- Interagency Hazard Mitigation Team Report for Wisconsin (July 23, 1993)
- Land and Water Resource Management Plan – Adams County by NCWRPC (March 1999)
- Long Range Flood Water Management Strategy for Adams County by NCWRPC (March 1996)
- Zoning Ordinance – Adams County (revised July 28, 1993)
- State of Wisconsin Hazard Mitigation Plan (2002)
- Tri-Lake Dams Emergency Action Plan (2003 update)

Contact Information

Emergency Management Coordinator
Adams County Courthouse
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Friendship, WI 53934
608-339-4248

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INTRODUCTION

Part II of the Adams County All-Hazard Mitigation Plan provides political, geographical, and demographic information on Adams County. This collection of data must be referenced in order to determine sound hazard mitigation strategies. The resulting information is an important element of the planning process, since sound alternative plans cannot be formulated and evaluated without an in-depth knowledge of the relevant conditions in the study area.

GENERAL GEOGRAPHY

Location

Adams County is located slightly south of central Wisconsin (See Map 1). The largest urban areas are the City of Adams, and the Village of Friendship, which border each other and are located in the center of the county. Marquette and Waushara Counties bound the county on the east, Portage and Wood Counties on the north, on the west by Juneau County, and on the south by Columbia County. Adams County is divided into 17 towns, the City of Adams, and the Village of Friendship. Adams County lies 150 miles northwest of Milwaukee; 116 miles southwest of Green Bay; 75 miles west of the Fox Valley; 81 miles south of Wausau; 78 miles north of Madison; and 87 miles east of La Crosse. Major metropolitan areas outside of Wisconsin with transportation linkages to Adams County are Chicago, 219 miles southeast; Minneapolis-St. Paul, 202 miles northwest; and Duluth, 294 miles north.

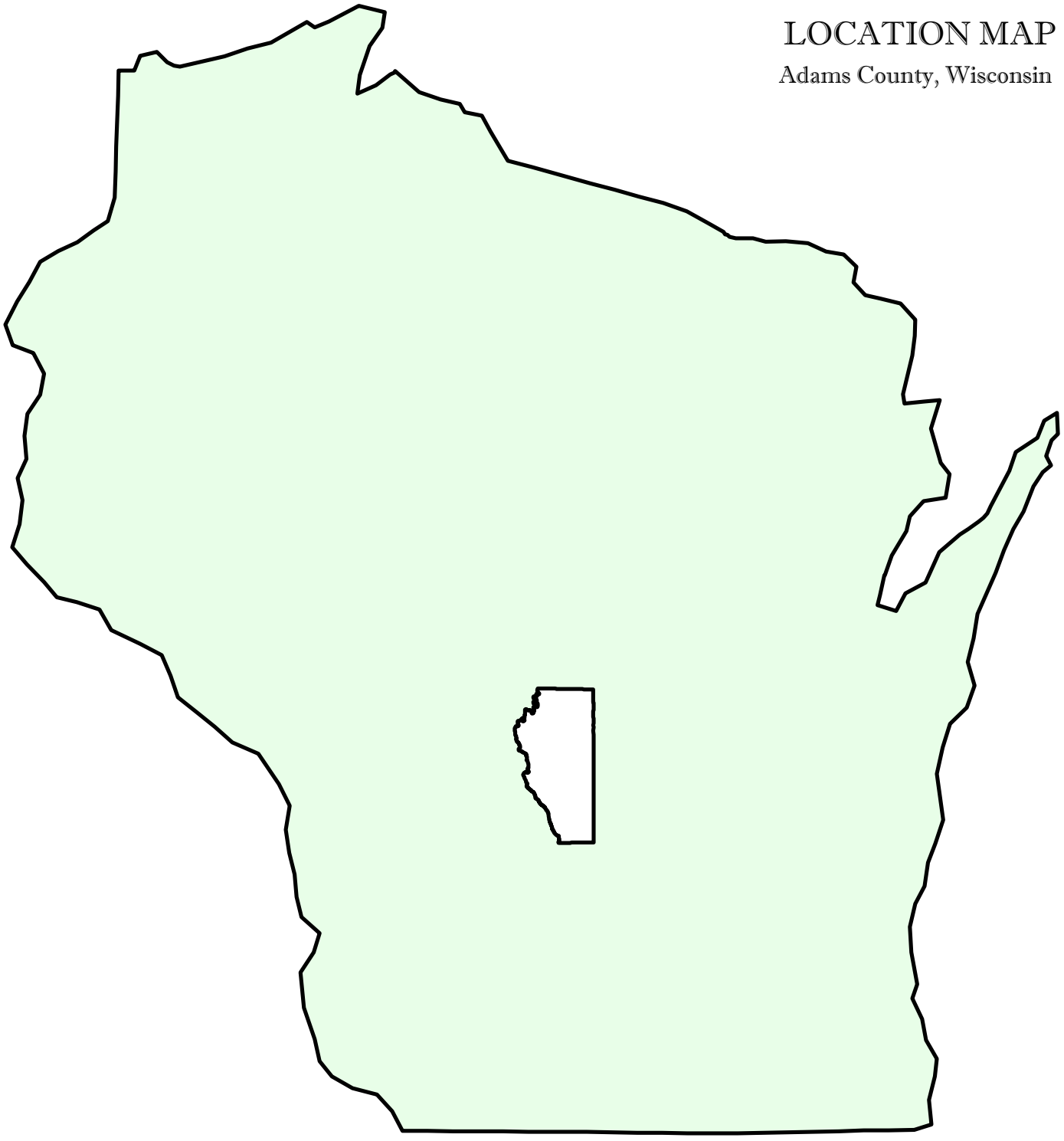
Civil Divisions

There are 19 municipalities (17 towns, Village of Friendship, and City of Adams) in Adams County and the planning area. These units of government provide the basic structure of the decision-making framework. The County has a total surface area of 689 square miles, of which 5.9 % is water. The area and proportion of the County within each civil division are presented in Table 1.

MAP 1

LOCATION MAP

Adams County, Wisconsin



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NORTH

20 0 20 40 60 Miles

SOURCE: NCWRPC GIS Database, 2003

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Table 1	Geographical Size by Civil Division			
	Area in square miles			
Municipality	Water area	Land area	Total area	Area as % of County
Adams city	0	2.94	2.94	0.4%
Adams town	0.09	50.5	50.59	7.3%
Big Flats town	0.01	48.1	48.1	7.0%
Colburn town	0	35.92	35.92	5.2%
Dell Prairie town	1.16	33.34	34.49	5.0%
Easton town	0.05	36.1	36.15	5.3%
Friendship village	0.03	0.89	0.92	0.1%
Jackson town	0.96	34.83	35.79	5.2%
Leola town	0	37.22	37.22	5.4%
Lincoln town	0	36.19	36.19	5.3%
Monroe town	16.58	21.91	38.49	5.6%
New Chester town	0.18	31.21	31.39	4.6%
New Haven town	1.14	29.27	30.41	4.4%
Preston town	0.47	35.39	35.86	5.2%
Quincy town	6.82	32.81	39.63	5.8%
Richfield town	0	35.45	35.45	5.1%
Rome town	8.06	54.26	62.31	9.0%
Springville town	0.75	43.9	44.65	6.5%
Strongs Prairie town	4.5	47.41	51.91	7.5%
Wisconsin Dells (part)	0	0.11	0.11	0.0%
Adams County	40.78	647.74	688.51	100.0%

U.S. Census

DEMOGRAPHIC AND ECONOMIC PROFILE

Population and Households

The most recent population estimate by the US Census Bureau is for 2002 which estimates a population of 20,515 people for the County. The 2000 Census reported a population base of 19,920 people. This figure represents about .35 of 1% of the State's total population. Approximately 14 percent of the population is urban residents and 86 percent are rural. Since 1990, the population of Adams County has increased by 27% or by

4,238 people (Refer to Table 2). That rate of increase in population was faster than many other areas of the state. If the growth rate continued at this same level, there will be approximately 22,167 people in Adams County in 2010, and 26,357 people in 2020.

TABLE 2	Population of Adjacent Counties			
County	**1990**	**2000**	**No. Change**	**% Change**
Adams	15,682	19,920	4,238	27.0%
Juneau	21,650	24,316	2,666	12.3%
Portage	61,405	67,182	5,777	9.4%
Wood	73,605	75,555	1,950	2.6%
Wisconsin	4,891,769	5,363,675	471,906	9.6%

Source: U.S. Bureau of the Census

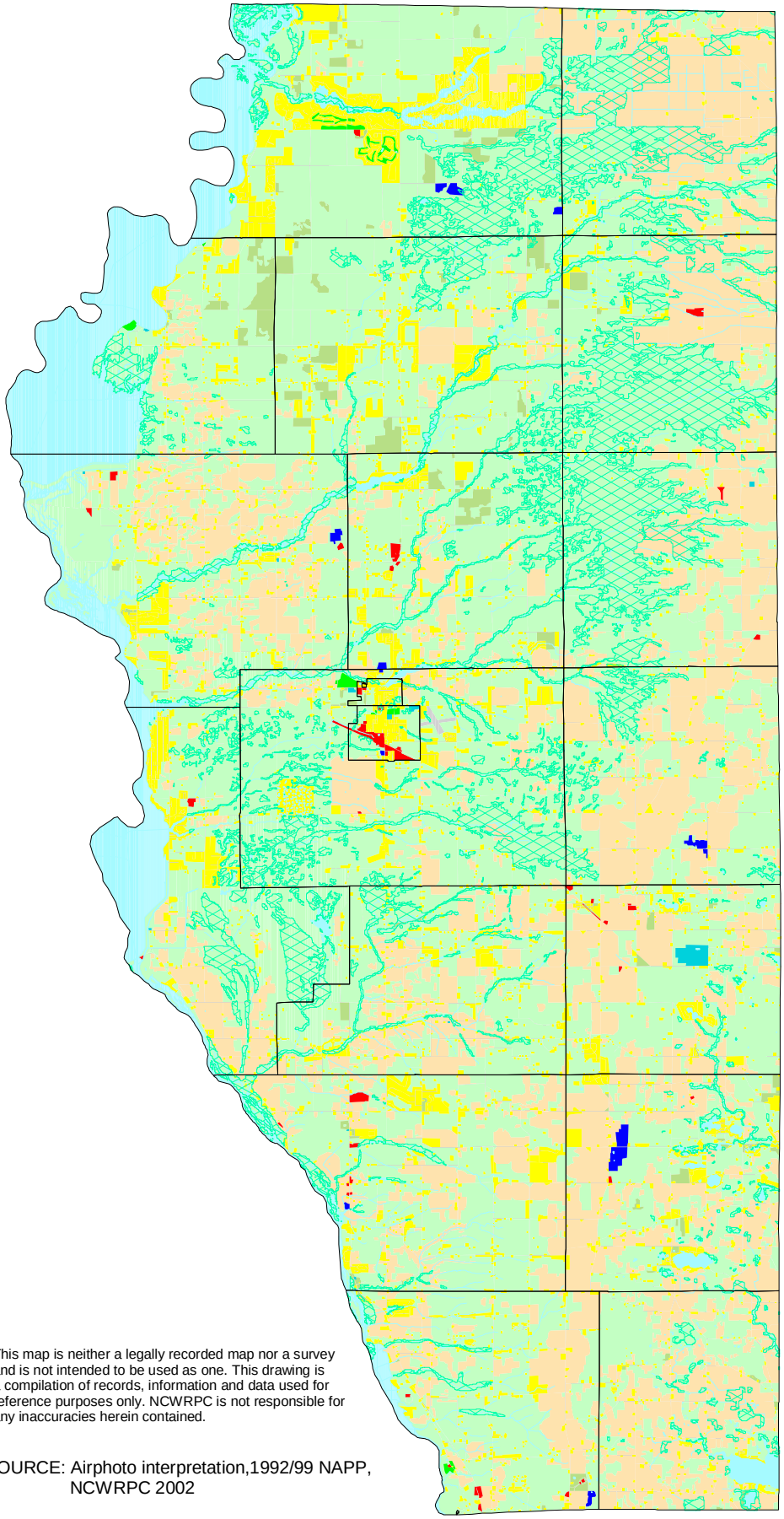
Population concentrations and trends are important when prioritizing hazard mitigation strategies. Adams/Friendship is one of the most densely populated and developed in the county. Other areas of population concentrations are around Lakes Camelot, Sherwood, and Arrowhead in the Town of Rome; along Castle Rock Lake in the Town of Quincy; and the communities of Dellwood, Easton, Brooks, Grant Marsh, and Big Flats. Map 2 (Land Use) shows areas of population concentrations in the County.

Between 1990 and 2000, most communities within Adams County have experienced an increase in their population base (refer to Table 3). The greatest amount of growth occurred in the Town of Rome with a 139% increase between 1980 and 2000. The County has gained a reputation in the last 15-20 years for being a retirement area in the central part of the state. Between 1990 and 2000, Adams County saw some of the biggest jumps in the state in population for those over 40 years of age. According to the Department of Workforce Development, this trend will probably continue in the years to come.

MAP 2

GENERALIZED LAND USE

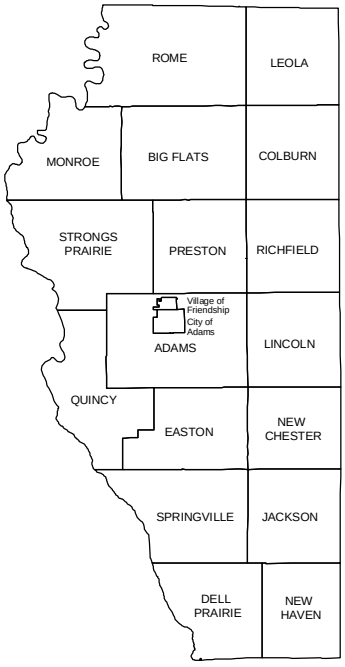
Adams County, Wisconsin



MINOR CIVIL DIVISIONS

- AGRICULTURE
- COMMERCIAL
- GOVERNMENTAL
- INDUSTRIAL
- OPEN GRASS LAND
- OUTDOOR RECRATION
- RESIDENTIAL
- TRANSPORTATION
- WATER
- WOODLANDS

WETLANDS OVERLAY



NORTH

2 0 2 4 6 Miles

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SOURCE: Airphoto interpretation,1992/99 NAPP, NCWRPC 2002

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Table 3	Population and Households Size of Civil Divisions					
MINOR CIVIL DIVISION	**1990 Population**	**1990 Households**	**2000 Population**	**2000 Households**	**% '90-'00 Population**	**90-'00 % Households**
Adams town	1,170	454	1,267	547	8.3%	20.5%
Big Flats town	731	294	946	402	29.4%	36.7%
Colburn town	154	60	181	83	17.5%	38.3%
Dell Prairie town	1,063	402	1,415	553	33.1%	37.6%
Easton town	824	326	1,194	486	44.9%	49.1%
Jackson town	641	271	926	397	44.5%	46.5%
Leola town	217	85	265	107	22.1%	25.9%
Lincoln town	318	124	311	129	-2.2%	4.0%
Monroe town	305	132	363	168	19.0%	27.3%
New Chester town	1,675	267	2,141	371	-48.4%	39.0%
New Haven town	511	199	657	260	28.6%	30.7%
Preston town	1,057	420	1,360	561	28.7%	33.6%
Quincy town	927	428	1,181	569	27.4%	32.9%
Richfield town	159	58	144	62	-9.4%	6.9%
Rome town	1,674	711	2,656	1,181	58.7%	66.1%
Springville town	785	342	1,167	487	48.7%	42.4%
Strongs Prairie town	1,028	411	1,115	502	8.5%	22.1%
Friendship village	728	251	781	257	7%	2.4%
Adams city	1,715	737	1,831	769	7%	4.3%
Wisconsin Dells city (part)	0	0	19	9	0.0%	0.0%
Adams County Total	**15,682**	**5,972**	**19,920**	**7,900**	**17%**	**32.3%**

Source: U.S. Census Data

Employment

Agriculture is the principal area of employment especially vegetable growing, playing an important role in this county. This is followed by small businesses and recreational sector services. Most of the private sector employees in the Adams County area employ fewer than 80-100 people at each site. There are few large employers with employment levels of 200-300 people, as there are in areas like Wood or Portage counties. The larger industries in Adams County are in the manufacturing and health care sector. Health care accounts for a little over 300 jobs in the area, which is a somewhat higher number than is usually found in a rural county the size of Adams. As seen in Table 4, many of the jobs are in residential and nursing home care, a fact that probably lends credence to the notion that Adams County is a retirement destination. Identifying

locations of large employment is important when prioritizing hazard mitigation strategies.

Table 4	**Top Employers in Adams County**		
Company	**Product or Service**	**Size**	**Location**
Adams-Friendship Public School	Public Education	250-499	Various locations
Oxford Prison	Federal Prison	250-499	T. of New Chester
County of Adams	County Public Employment	250-499	Various locations
Smurfit Stone	Stone Products	100-249	C. of Adams
Chula Vista	Motel	100-249	T. of Dell Prairie
Adams Co. Memorial Hospital Assn.	Health Care	100-249	V. of Friendship
Villa Pines Living Center	Health Care	100-249	V. of Friendship
Spencer IGA	Retail and Food	100-249	C. of Adams
Terrace Homes	Prefabricated Buildings	50-99	T. of Preston

Adams County and NCWRPC

The value of the real estate and personal property in a community reflects the upper end of the potential for property damages in each community. The annual equalized value of each municipality represents the Department of Revenue estimate of market value (Agricultural land is included at Use Value) of all taxable property. Property tax levies of jurisdictions are apportioned to each municipality on the basis of equalized value. Table 5 lists each municipality's total equalized values for real estate, personal property, and all property and the percent each municipality represents of the county total.

Table 5	Equalized Value by Civil Division			
District	Real Estate	Personal Property	Total	% of Total
Adams town	$72,577,600	$2,414,900	$74,992,500	4.9%
Big Flats town	$52,071,200	$341,200	$52,412,400	3.5%
Colburn town	$27,169,600	$201,000	$27,370,600	1.8%
Dell Prairie town	$112,611,400	$1,007,500	$113,618,900	7.5%
Easton town	$53,357,900	$732,000	$54,089,900	3.6%
Jackson town	$117,864,300	$875,200	$118,739,500	7.8%
Leola town	$26,860,500	$322,800	$27,183,300	1.8%
Lincoln town	$28,011,700	$28,800	$28,040,500	1.8%
Monroe town	$50,730,800	$302,700	$51,033,500	3.4%
New Chester town	$53,783,300	$276,600	$54,059,900	3.6%
New Haven town	$32,149,200	$164,100	$32,313,300	2.1%
Preston town	$95,010,700	$454,800	$95,465,500	6.3%
Quincy town	$125,300,100	$1,973,000	$127,273,100	8.4%
Richfield town	$22,153,100	$127,900	$22,281,000	1.5%
Rome town	$380,556,400	$2,554,500	$383,110,900	25.2%
Springville town	$82,377,200	$615,800	$82,993,000	5.5%
Strongs Prairie town	$98,214,600	$130,000	$98,344,600	6.5%
Friendship village	$20,345,900	$1,721,200	$22,067,100	1.5%
Wisconsin Dells (part)	$686,600	$0	$686,600	0.0%
Adams city	$49,639,600	$2,405,900	$52,045,500	3.4%
Adams County	$1,501,471,700	$16,649,900	$1,518,121,600	100.0%

Department of Revenue

LAND USE/LAND COVER AND DEVELOPMENT PATTERNS

Land use is an important determinant in the potential impact a particular hazard may have, and in action which may be taken to mitigate the hazard impacts. An understanding of the amount, type, and spatial distribution of urban and rural land uses within the County is an important consideration in the development of a sound hazard mitigation plan.

The North Central Wisconsin Regional Planning Commission (NCWRPC) has categorized land use in Adams County into ten classifications. Aerial photos were used to digitize a land use Geographic Information System (GIS) coverage. Map 2 shows the land use and surface water in Adams County. Table 6 shows the acreage and percent of each classification.

Forestry and Agriculture

The dominant land-use in Adams County is forestry and agriculture. Land area in the County is approximately 57 percent forested, comprised of

251,358 acres of woodland. Agricultural land covers another 25 percent of the county's land area. The main agricultural practices in the county are irrigated vegetables and dairy farming. There are also 200-500 acres of cranberry production concentrated in the Town of Leola. Agriculture is scattered through out the county but much of it is on the eastern side. According to the Wisconsin Agricultural Statistic Service, Adams County has actually gained 2,357 acres of farmland between 1982 and 1997 – something uncharacteristic compared to the majority of Wisconsin's counties.

Residential Development

Land in residential development makes up 7.8 percent of the total county area. Residential concentrations are scattered throughout the county (see "Population and Households" above). Much of the scattered rural development is related to direct recreational demand as various types of housing have clustered along streams and lakes.

There are a number of mobile home parks in the county. According to the U.S. Census, there were 3,748 mobile homes in 2000. This is about 27 percent of housing units for the County compared to about 4 percent for the entire state. This is significant due to their vulnerability in natural hazards especially tornadoes. Map 15 displays the mobile home concentrations within the County.

Commercial and Industrial Development

Commercial and industrial development makes up only about 0.4 percent of the total area of the County. Land use for commercial and industrial development is also scattered throughout the county. There are four designated industrial parks in Adams County. They are in the City of Adams, Village of Friendship, Town of Preston, and Town of Rome. Other industrial sites are located in the Town of Jackson and Lincoln. Commercial activity is located in the City of Adams and Friendship where it serves as a sub regional service center supported by the surrounding agri-business and tourist industry. Commercial activity in the unincorporated areas is primarily dominated by private commercial recreation.

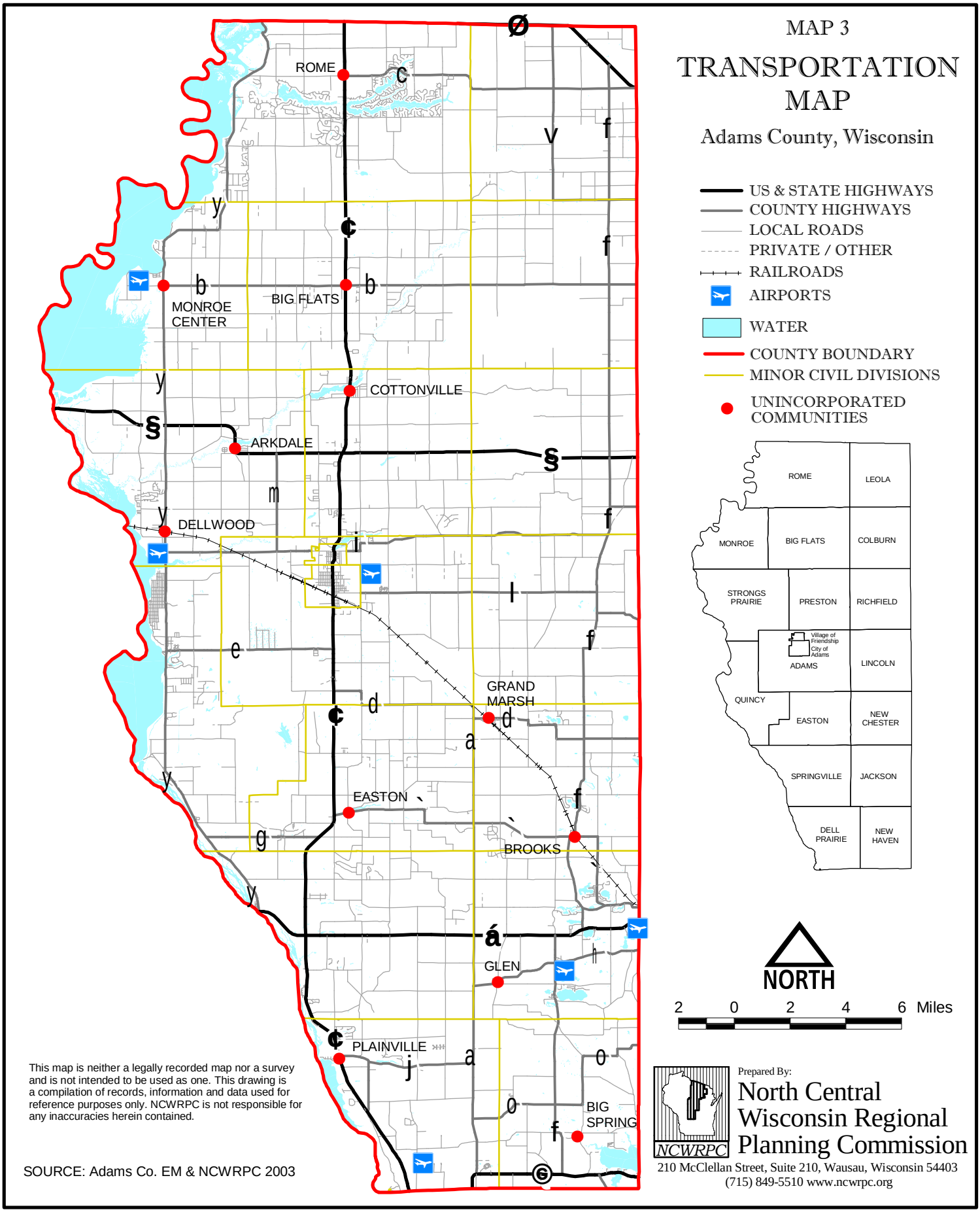
Table 6	Land Use in Adams County	
Description	**Acres**	**Percent**
Agriculture	111,910	25.4%
Commercial	873	0.2%
Governmental	404	0.1%
Industrial	681	0.2%
Open Grass Land	5,841	1.3%
Outdoor Recreation	555	0.1%
Residential	34,353	7.8%
Transportation	7,331	1.7%
Water	27,143	6.2%
Woodlands	251,358	57.1%
Total	440,449	100.0%

NCWRPC

Transportation

The transportation system of Adams County provides the basis for movement of goods and people into, out of, through, and within the County. An efficient transportation system is essential to the sound social and economic development of the County and the Region. The analysis of transportation routes should be considered in the possible event of the major accidents or spills of hazardous materials. Trucks are the most common way of transporting hazardous materials, accounting for as much as 94% of all hazardous material shipments nationwide according to the USDOT.

Highways link Adams County with some of Wisconsin's major cities including: Wisconsin Dells, Wisconsin Rapids, Marshfield, Stevens Point, Wausau, Madison, Tomah, Portage, and Oshkosh. They are the arteries which feed Adams County its workforce, visitors, goods, and resources. Map 3 shows the Adams County transportation system. The County is served by five State Highways 13, 21, 23, 73, 82, which provide 98 miles of highway access. Highway 13 runs north-south through the center of the county. Highway 21 runs east-west through the northern third of the county. Highway 23 runs east-west near the southern border of the county. Highway 73 runs east-west along the northern border of the county. Highway 82 runs east-west through the southern third of the



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SOURCE: Adams Co. EM & NCWRPC 2003

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county. The county also maintains an additional 224 miles of its own highway system, along with 1,107 miles of local roads.

The Union Pacific Railroad also serves Adams County. Although trucks transport most of the hazardous materials in the state and the U.S., rail can carry significantly larger and various loads.

The "Adams County Legion Field" airport located east of the City of Adams serves the area. It is a basic utility-B airport which is designed to accommodate aircraft of less than 12,500 pounds gross weight, with approach speeds below 121 knots and wingspans of less than 49 feet. There are 5 other landing strips within the county.

Surface Water

The majority of the land in the County is part of the Central and Upper Wisconsin River Basins. Five main watersheds make up the two Wisconsin River basins in Adams County – Fourteen Mile Creek, Big Roche A Cri, Little Roche A Cri, Duck and Plainville Creeks, and Neenah Creek. The Johnstown terminal moraine in southeastern Adams County forms the drainage divide between the Wisconsin and Upper Fox River Basins. Neenah Creek is the main watershed in Adams County for Upper Fox Basin.

Within the watersheds, there are 73 interior streams covering 234.5 linear miles and 450 surface acres (see Map 4), but 12 (of 26) named steams and 27 (of 47) unnamed streams possessing 31 percent of the total stream frontage have average widths of less than 10 feet, making them relatively undesirable for development. However, all the streams, like the lakes, are important in the hydrological and ecological regime and should be protected by shoreland zoning and physical protective measures.

Streams in Adams County, except the Wisconsin River, have their headwaters in outwash plains, which contribute relatively large and constant amounts of groundwater base flow to the streams. Regional average runoff in Adams County is about nine inches/0.7 cfs per square mile of drainage basin. The Wisconsin River is well regulated and has a relatively constant flow.

The total surface water area of lakes and streams in Adams County exceeds 20,000 acres. Petenwell and Castle Rock flowages, the second and fifth largest lakes in the state cover 16,295 acres together. Like most of the counties in the west central part of the state, Adams County has relatively few natural lakes of any significance, primarily in the pitted outwash area east of the terminal moraine. Forty-eight interior lakes add

2,439 acres, of which 22 have surface areas of less than 5 acres. Twenty-nine lakes have maximum depths of less than 10 feet, and almost half of all lakes are subject to winterkill because of shallowness. The two flowages and the 22 named lakes provide the bulk of the County's high quality lake resources. Of the 26 unnamed lakes, the largest is 12.5 acres, only one is over ten feet deep, and 17 have no fishery. Named lakes have a total of about 71 miles of shoreline, and unnamed lakes add another 7 miles.

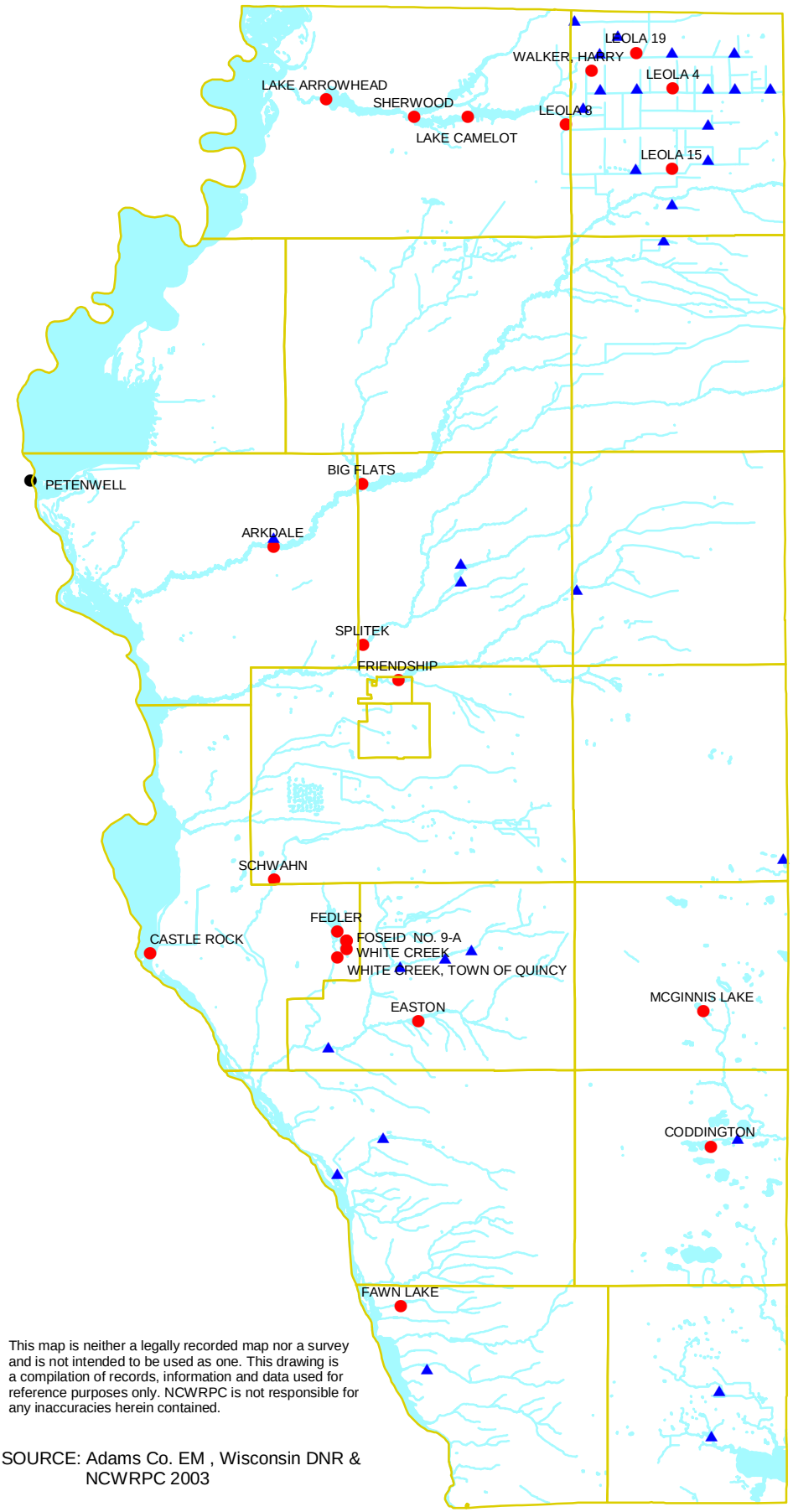
Lake Sherwood, Lake Camelot, and Lake Arrowhead Dams are located in the Town of Rome. Map 4 shows the location of these of these dams. The three lakes were designed for recreational and economic purposes related to property development. The lakes were formed by artificially constructing earth dams made of native soil material across the river valleys.

In 1967, Lake Sherwood was the first of the three dams created by damming Fourteen Mile Creek and Spring Branch Creeks. Lake Camelot was created in 1969 by damming Spring Branch Creek near the end of the upper arm of Lake Sherwood and Fourteen Mile Creek near the end of the lower arm. A channel between the two diverts part of the greater flow of Fourteen Mile Creek to the upper part of Lake Camelot to reduce stagnation problems which could have arisen from the low flow in Spring Branch Creek and resultant slow replacement of water in the lake. The Lake Arrowhead Dam was the last of the series of dams constructed in 1978 over Fourteen Mile Creek and is located approximately 2.7 miles west of State Highway 13.

Floodplain

The primary value of floodplains is their role in natural flood control. Flood plains represent areas where excess water can be accommodated whether through drainage by streams or through storage by wetlands and other natural detention/retention areas. Specific areas that will be inundated will depend upon the amount of water, the distance and speed that water travels, and the topography of the area. If uninterrupted by development, the areas shown on a map as floodplains should be able to handle the severest (regional) flood, i.e. those that have a probability of occurring once every one hundred years.

There is a value in preserving and protecting these natural flood control areas from encroachment. First, by preventing development in the floodplain, the cost of building dikes, levies, or other man-made flood control devices will be saved. Second, for each structure that is constructed in a flood-prone area, that flood-prone area expands,



MAP 4

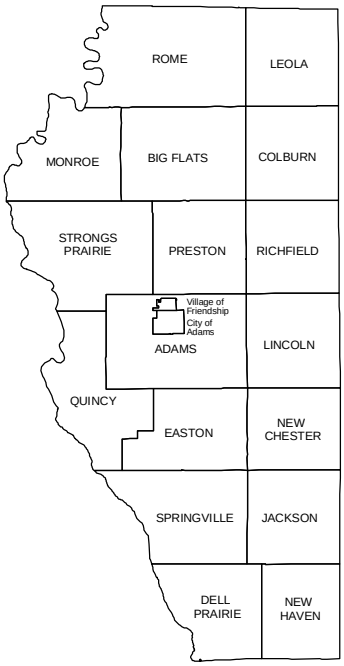
SURFACE WATER & DAMS

Adams County, Wisconsin

DAMS
- LARGE
- SMALL

MINOR CIVIL DIVISIONS

WATER



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potentially subjecting other structures originally built outside the delineated flood hazard area to the risk of flooding. Each new structure (or modification to existing) placed in the flood plain puts more life and property in danger.

Counties, cities, and village are required to adopt reasonable and effective floodplain zoning ordinances. The requirement is found in section 87.30 of the Wisconsin Statutes and Chapter NR 116 of the Wisconsin Administrative Code. Floodplain zoning is designed to protect individuals, private property, and public investments from flood damage.

Floodplain zoning maps identify areas where major floods occur. Regulations prohibit development in the floodway, the most dangerous flood area. In other flood areas, the flood fringe, development that is built above flood levels and otherwise flood-protected is allowed if it is in accordance with local ordinances. For regulatory purposes, a floodplain is generally defined as land where there is a one percent chance of flooding in any year (also known as the 100-year floodplain).

In order to participate in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program, the County, City of Adams, and Village of Friendship have completed a Flood Insurance Study and a Flood Insurance Rate Map (FIRM) that encompasses Adams County. This FIRM delineates the "A" Zones including the floodway and flood fringe which are those areas inundated by the 100-year flood within the County. According to the FIRMs, there are 19,016 acres floodplain in Adams County, or 4.6 percent of the land area. Map 5 shows the approximate floodplains in Adams County. Floodplains in Adams are small and floods occur only during periods of exceptionally heavy rainfall.

Wetlands

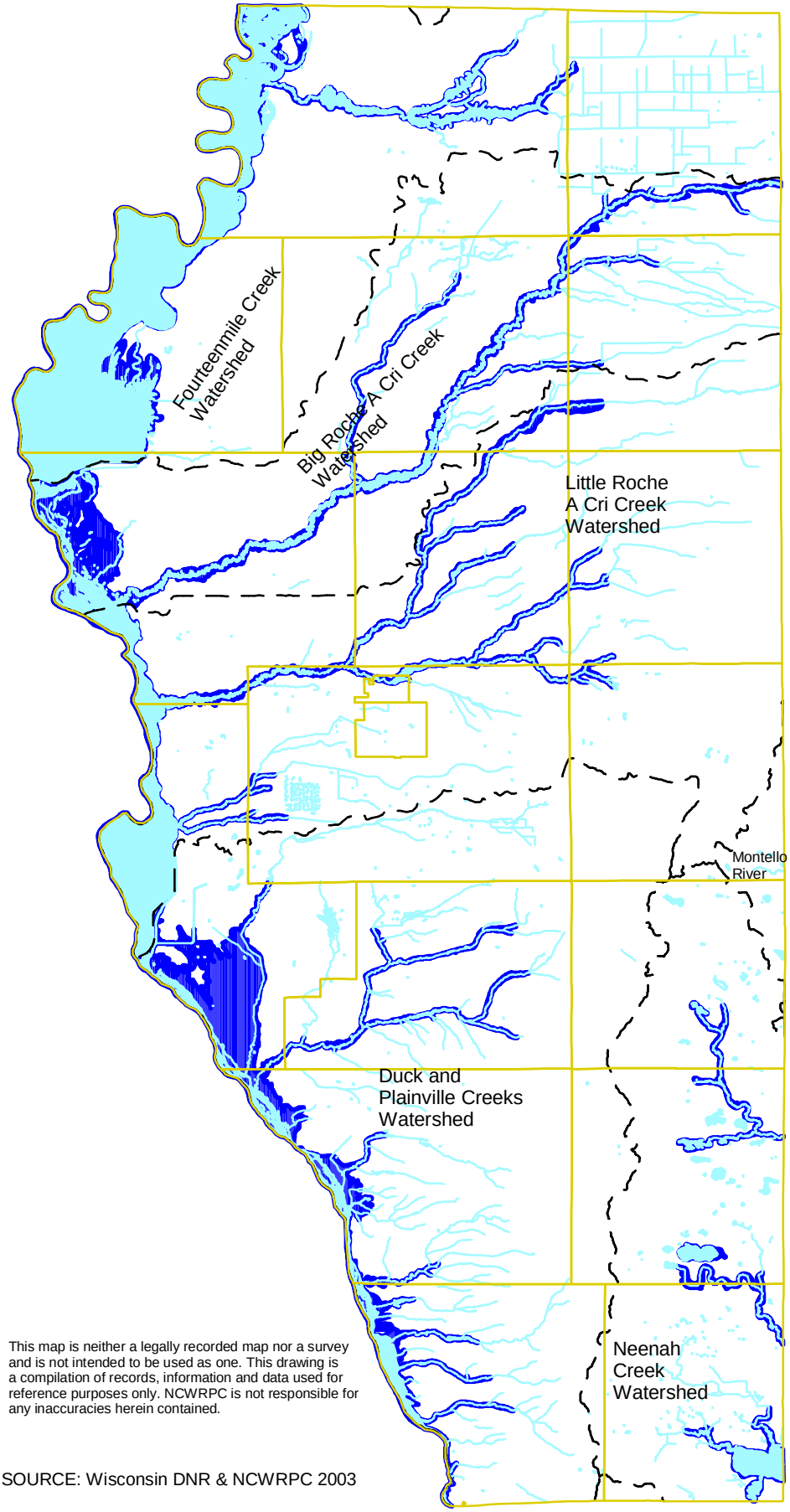
Wetlands perform many indispensable roles in the proper function of the hydrologic cycle and local ecological systems. In terms of hazard mitigation, they act as water storage devices in times of high water. Like sponges, wetlands are able to absorb excess water and release it back into the watershed slowly, preventing flooding and minimizing flood damage. As more impermeable surfaces are developed, this excess capacity for water runoff storage becomes increasingly important.

The DNR has also identified the location of wetlands on their WISCLAND database. According to this, Adams County has 48,348 acres, or 11 percent of its total area. Map 2 shows these wetland areas in Adams County. There are concentrations of wetlands in Adams County including

MAP 5

FLOODPLAINS & WATERSHEDS

Adams County, Wisconsin

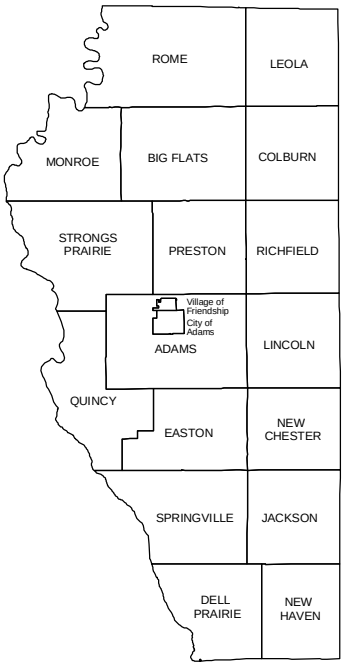


WATERSHED BOUNDARIES

WATER

FLOODPLAIN

MINOR CIVIL DIVISIONS



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Leola Marsh Wildlife Area, Colburn Wildlife Area, and the Quincy Bluff and Wetland Natural Area. Additional wetlands are associated with the floodplains discussed above, however, smaller wetlands are scattered throughout the County.

Eradication of wetlands can occur through the use of fill material. This can destroy the hydrological function of the site and open the area to improper development. The Wisconsin Department of Natural Resources (DNR) has promulgated minimum standards for managing wetlands.

Utilities

Utility systems are important in hazard mitigation planning because of the dependency on water, wastewater treatment, gas service, electricity, and communications. Because of this reliance and vulnerability to hazards, utility systems must be identified for this Plan.

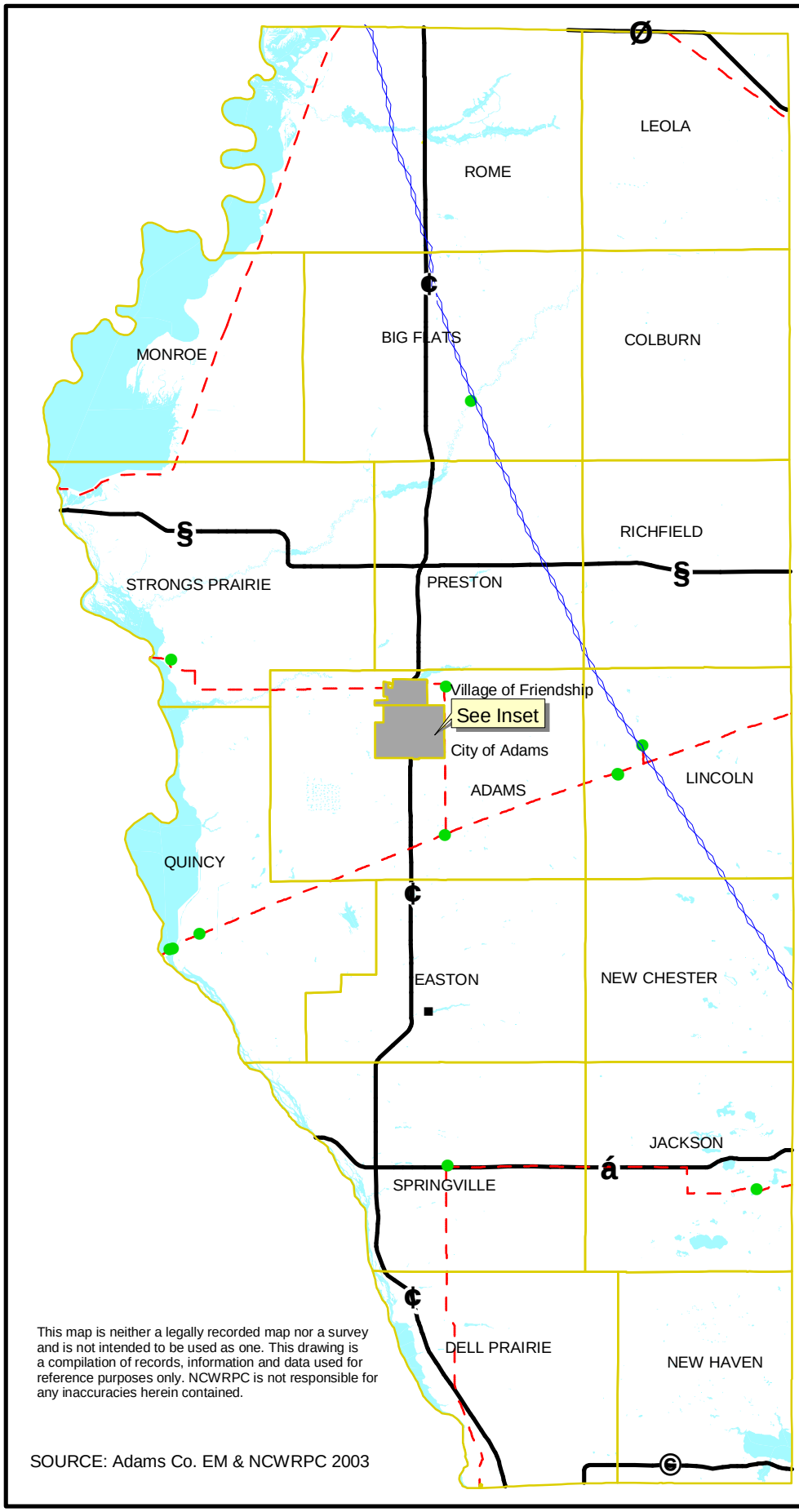
The protection of the public water supply facilities from potential contamination from hazards such as flooding is a consideration for hazard mitigation planning. The City of Adams and Village of Friendship provides municipal water supplies for domestic and commercial use, while the Oxford Federal Correctional Institution supplies water for their inmates. Adams Waterworks serves 714 customers, Friendship Waterworks serves about 350, and the Oxford Federal Prison provides water needs for approximately 1,200 inmates. The Rome Water Utility also provides a private water supply system to 1,076 customers around Lake Camelot.

The protection of the wastewater facilities is an important consideration for hazard mitigation planning because of its potential to contaminate nearby waterbodies in the event of high water. Also of concern during periods of flooding is the threat of damage to infrastructure of associated facilities. A municipal wastewater treatment facility that serves the Adams-Friendship area is located on the west side of Friendship along the Little Roche a Cri Creek. This utility is located outside the designated floodplain area. A private wastewater treatment facility serves the Easton Lake District. It is located in the Town of Easton along Campbell Creek. This is of concern because of its location in designated floodplain.

Wisconsin Gas Company provides natural gas to the City of Adams and Friendship, along with the towns of Preston, Adams, Richfield, Lincoln, Colburn, New Chester, Rome, and Jackson.

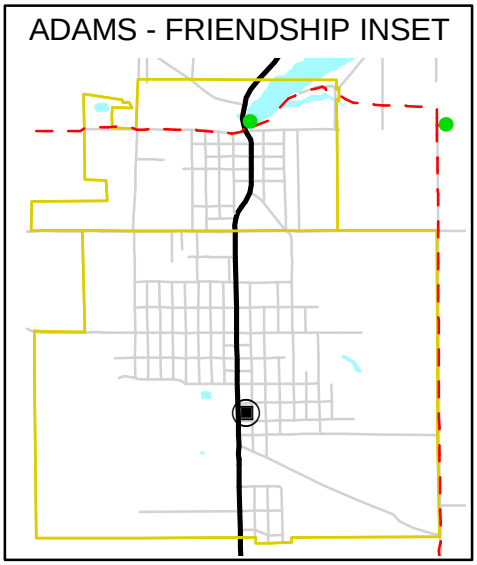
The infrastructure of electric and telephone lines should be considered in the events of high wind, ice storms, tornadoes, flooding, and fire. Alliant

MAP 6
UTILITIES



Adams County, Wisconsin

- MINOR CIVIL DIVISIONS
- US & STATE HIGHWAYS
- PIPELINES
- SUB-STATIONS
- HIGH-VOLTAGE LINES
- WATER TREATMENT
- WASTE WATER TREATMENT
- WATER



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and Wisconsin Public Service provide Adams County with electric service throughout the County. As of 2001, an independent company, American Transmission Company (ATC), owns, maintains, and operates the major transmission facilities located in the State of Wisconsin, including Adams County. The general locations of the major electrical transmission facilities, owned by ATC are shown on Map 6. Four providers in the County – Wood County, Union, GTE North, and Marquette-Adams, supply telephone service.

Emergency Services and Facilities

The type and location of public emergency services are an important consideration in hazard mitigation planning, because of the potential direct involvement of such facilities in certain hazard situations. The location of fire stations, police departments, and ambulance services in Adams County are shown on Maps 7 through Map 9 .

There are six fire stations that serve the local units of governments in Adams County. The Rome Fire Department provides a full-time fire chief, while the remainder of the departments relies on volunteers for this service. Seven municipalities rely on the Adams County Fire District, and five departments are located outside the County - Coloma, Hancock, Plainfield, Oxford, and Wisconsin Dells. The location of each of the fire stations and fire service areas are on Map 7.

There are five ambulance service providers to the County. Adams County Memorial Hospital provides 13 municipalities service. Waushara covers the Town of Leona. Marquette County ambulance covers the Towns of Jackson and New Chester. Nekoosa provides their service to the Town of Rome through their fire department. Wisconsin Dells provides their municipally owned service to the Towns of Dell Prairie, Springville, and New Haven. The locations of ambulance service areas are on Map 8.

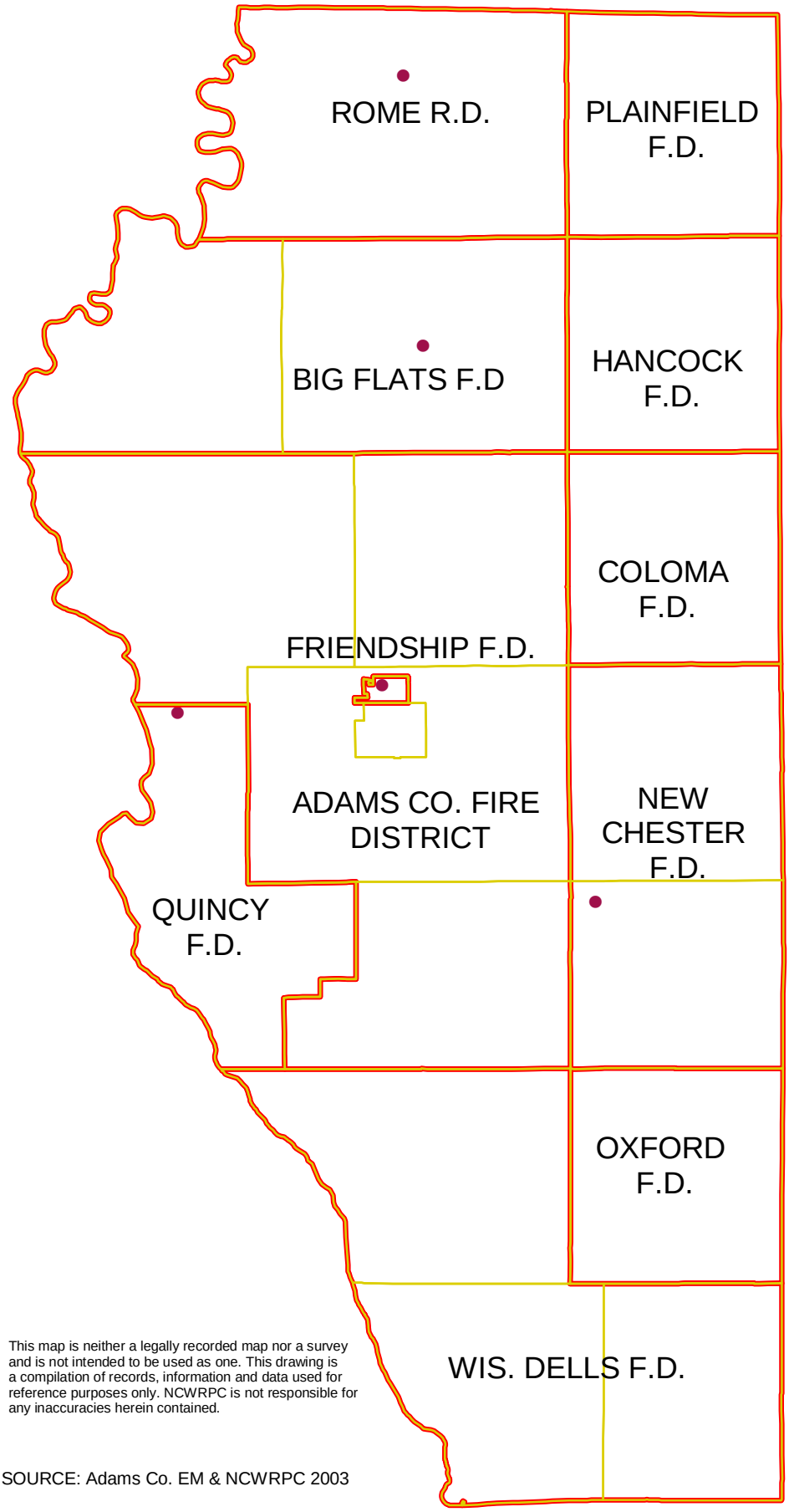
The Adams County Sheriff's Department provides service to all the towns and the Village for law enforcement. The County has four road sergeants, three investigators, 15 full time officers, three part time officers, and nine dispatchers. The City of Adams has five full time officers and two part time officers. The Town of Rome is provided with seven full-time officers and one part-time officer. The County provides dispatch to the City and Rome. The locations of police service areas are on Map 9.

To coordinate these services, Adams County has created an *Emergency Operations Plan (EOP)* (updated in 2002). This provides a general overview for county and municipal emergency response personnel during response to a number of disasters. This document serves to coordinate the County

MAP 7

FIRE SERVICE

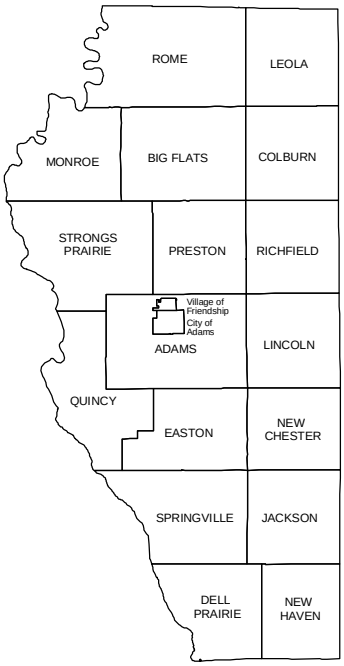
Adams County, Wisconsin



FIRE DISTRICT BOUNDARIES

MINOR CIVIL DIVISIONS

FIRE DEPARTMENTS



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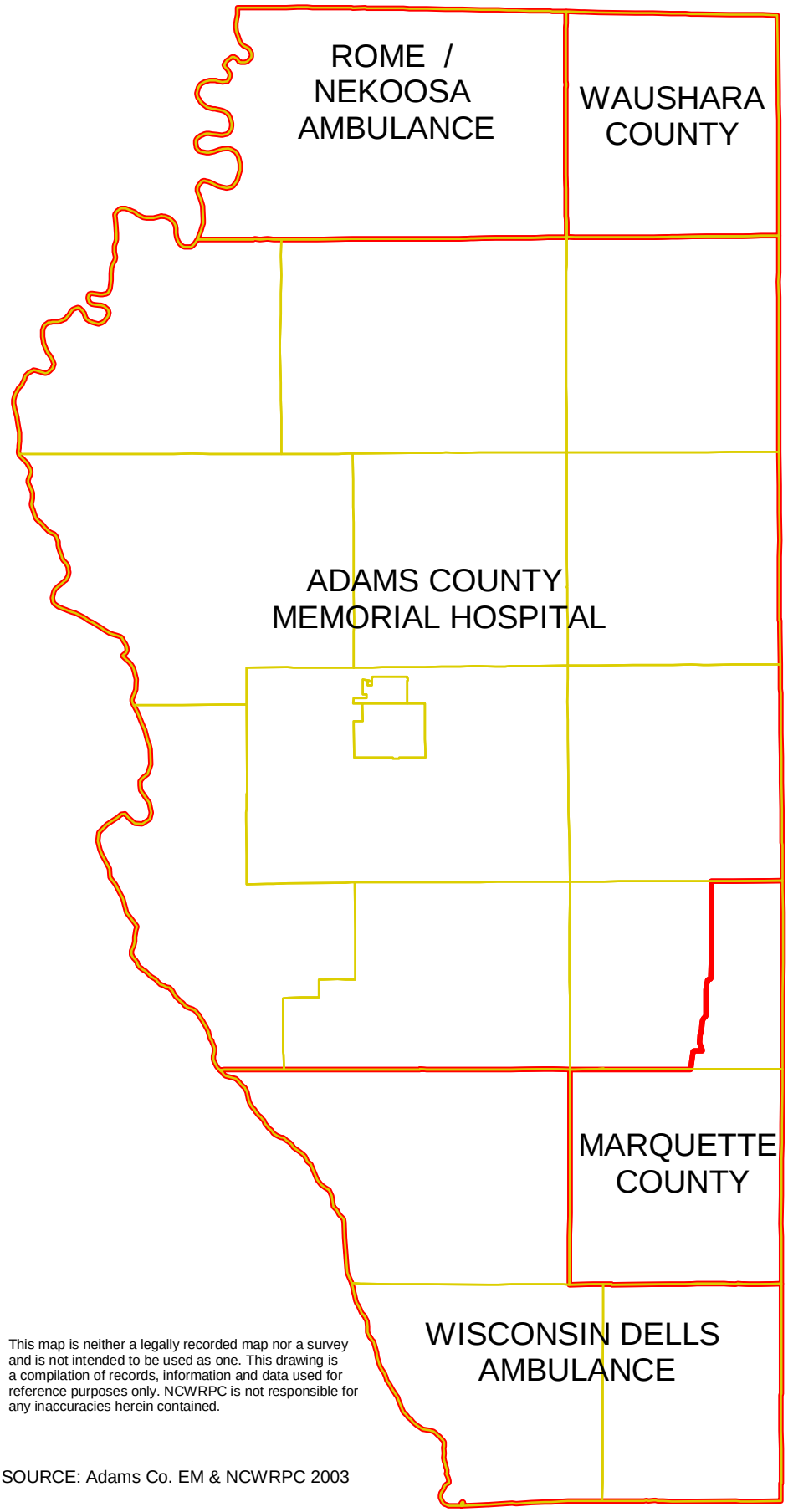
MAP 8

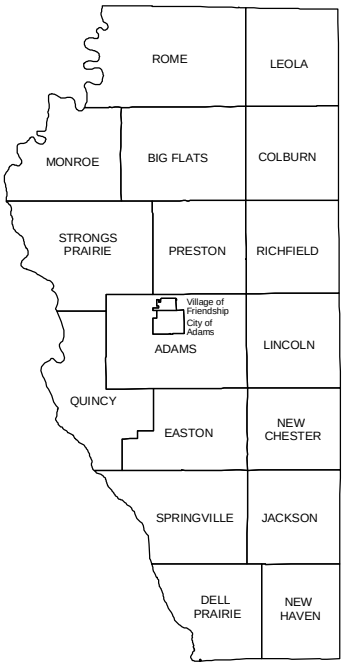
AMBULANCE SERVICE

Adams County, Wisconsin



SERVICE BOUNDARIES

MINOR CIVIL DIVISIONS



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and local units of government during times of response and recovery. It also provides a link between the County and municipal plans.

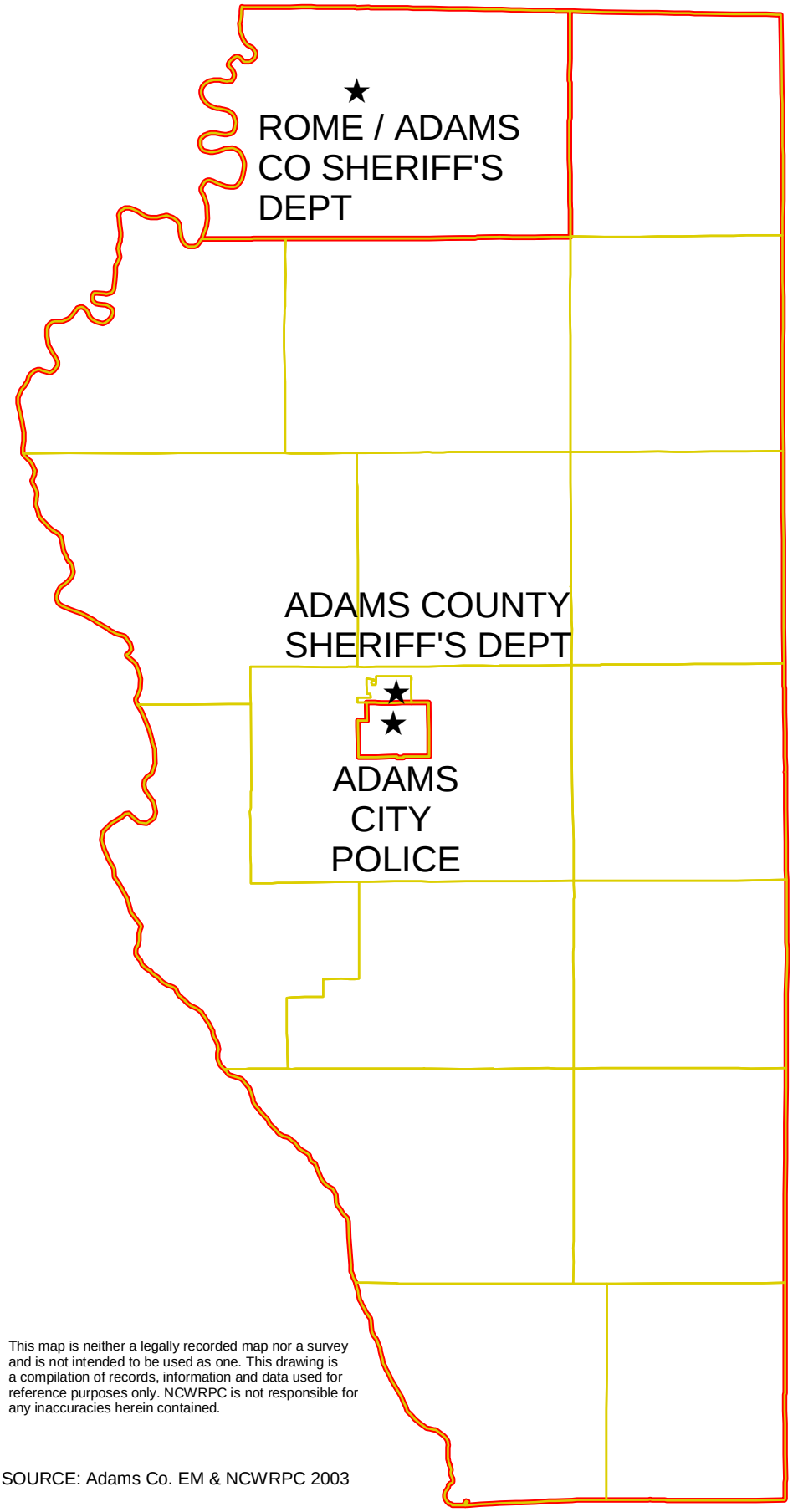
Critical Community Facilities

In addition to emergency service facilities, other community faculties that are of importance in hazard mitigation planning include schools, hospitals, nursing homes, and government administration buildings. Map 10 shows the location of selected types of critical community facilities within Adams County.

MAP 9

POLICE SERVICE

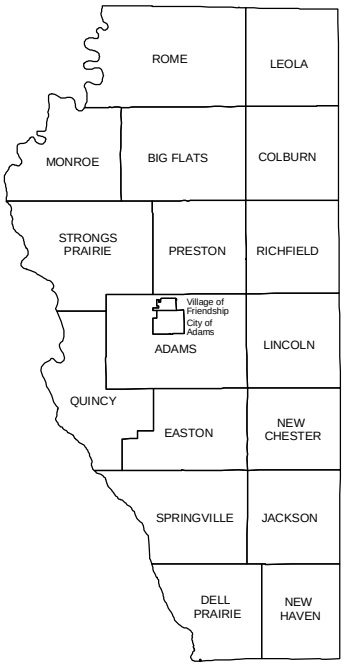
Adams County, Wisconsin



SERVICE BOUNDARIES

MINOR CIVIL DIVISIONS

★ POLICE DEPARTMENTS



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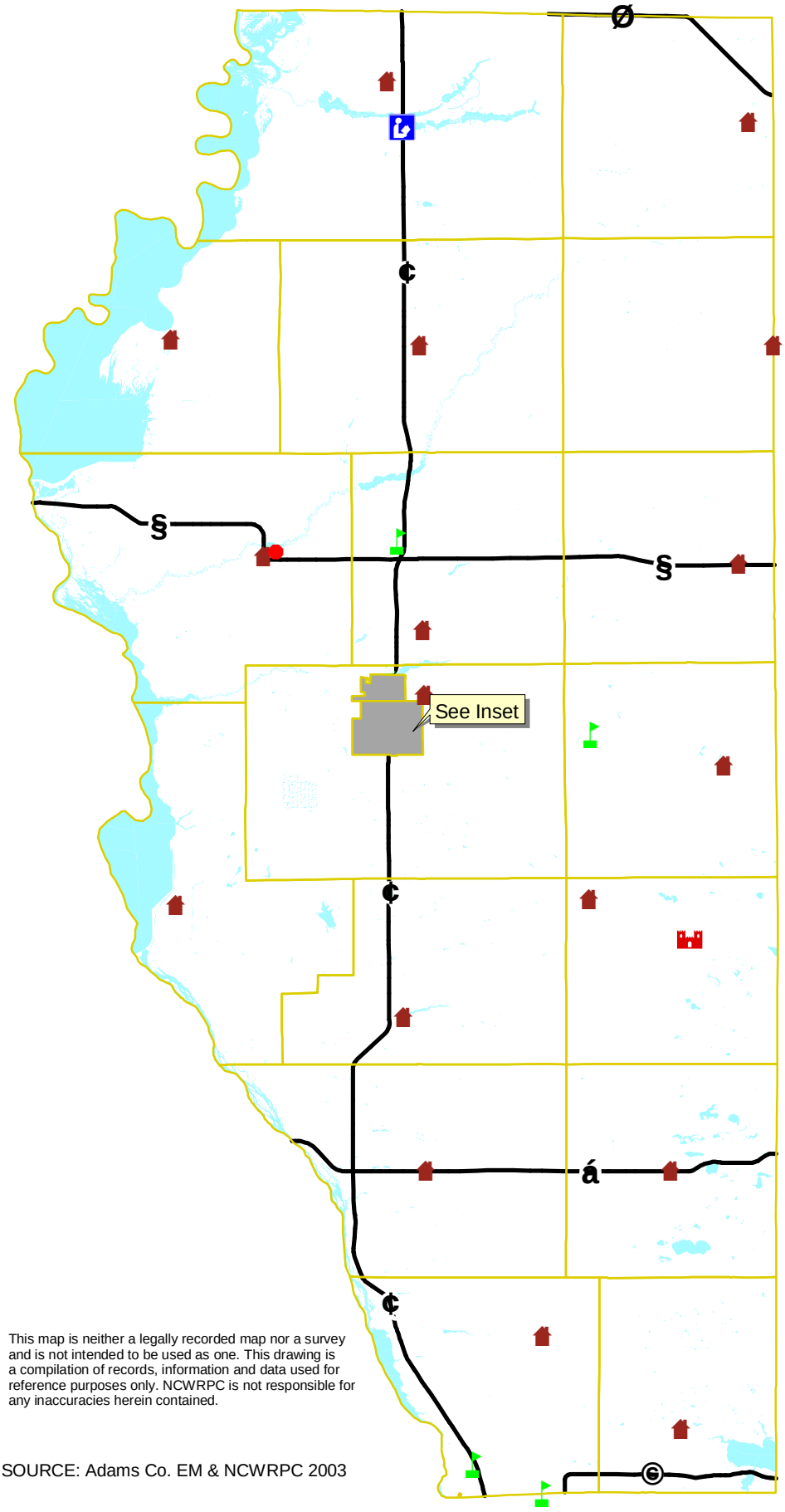
MAP 10

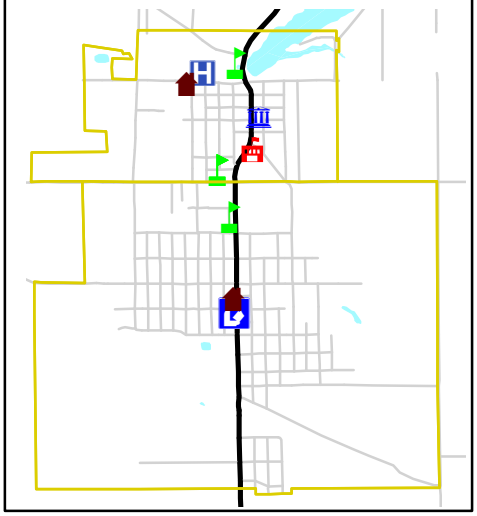
CRITICAL COMMUNITY FACILITIES

Adams County, Wisconsin

- MINOR CIVIL DIVISIONS
- US & STATE HIGHWAYS
- CITY/VILLAGE/TOWN HALLS
- PRISON
- SCHOOLS
- HOSPITAL
- LIBRARY
- COURTHOUSE
- DNR RANGER STATION
- TORNADO SHELTER
- WATER



ADAMS - FRIENDSHIP INSET



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INTRODUCTION

Analyzing the hazard in a community is an important and vital step in the mitigation planning process. Before mitigation strategies can be determined, a risk assessment must be made. Part III of Adams County All-Hazard Mitigation Plan will focus on the following:

- Identification of all types of natural and manmade hazards that can affect Adams County
- An analysis of the hazards identified in Adams County
- History of previous occurrences of hazard events
- The County's vulnerability to future events

HAZARD IDENTIFICATION

The process of identifying those hazards that should be specifically addressed in the Adams County All-Hazard Mitigation Plan was based on consideration of a number of factors. The process first included a review of past hazard events to determine the probability of future occurrences and threat to human safety and property damage.

The most accessible tool in identifying hazards in Adams County was from reports that already existed. In November 2002, the Wisconsin Emergency Management (WEM) created the *Hazard Analysis for the State of Wisconsin*. It details the hazards that have caused or are likely to cause disasters in Wisconsin. This report also discusses hazards that threaten public health and safety, but may not be likely to cause a disaster. The descriptions of disasters, hazards and threats include information on frequency of occurrence, significant occurrences, potential and actual impacts and related programs.

A listing of possible hazards was to help identify which hazards should be included in the Plan. The identification also included input from the Adams County Emergency Management Coordinator and the Emergency Management Committee.

Based on these factors, hazards listed in this chapter are ranked according to threat to human safety and possible damage to property. The priority ranking of hazards accepted by the Committee is as follows:

1. Flooding
2. Dam Failures
3. Severe Thunderstorms
4. Tornados
5. Winter Storms
6. Drought
7. Forest/Wild Fires
8. Hazardous Materials Incidents

HAZARD ANALYSIS

The next step after identifying a hazard is to define the hazard and give some general background behind it. This can include occurrence of hazard within the County or State. This section of Part III may also give some indication of the risk to public health and safety and to personal and public property.

HISTORY OF HAZARDS

Past experiences of disasters is an indication of the potential for future disasters for which Adams County would be vulnerable. A review of past occurrences for each identified hazard in Adams County was completed.

Some disasters have had damages that have exceeded the capabilities of local communities and state agencies. Federal assistance is then requested. Federal assistance may be offered through a variety of programs. Assistance may be directed to agricultural producers, individuals and families, businesses, or local governments. There have been seven natural disasters in Adams County where a Presidential Declaration was requested from 1971-2002. They include the following:

- 1973 Flood – Presidential Disaster Declaration Approved
- 1976 Drought - Presidential Disaster Declaration Approved
- 1993 Flooding - Presidential Disaster Declaration Approved
- 1994 Tornadoes/Severe Storms - Presidential Disaster Declaration Denied
- 2000 Heavy Rain/Severe Storms/Flooding - Presidential Disaster Declaration Approved
- 2001 Flooding, Severe Storms, Tornado, Heavy Rains - Presidential Disaster Declaration Approved
- 2002 Heavy Rains/Winds/Tornadoes - Presidential Disaster Declaration Approved

It should be noted that this significantly underestimates the number of hazards that have occurred in Adams County. Almost every year there are significant weather events or disasters cause millions of dollars in damage for which no Federal disaster assistance is requested. Major indicators of hazard severity are the deaths, injuries, and economic losses resulting from natural hazards and disasters.

The National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) publishes National Weather Service (NWS) data describing recorded weather events and resulting deaths, injuries, and damages. From August 16, 1966 to July 30, 2003, NCDC reported 159 weather events for Adams County. Table 7 summarizes the NCDC data by

event. Though this data does give a good indication of the severity of each event, it is not indicative of the extent of deaths, injuries, and damage for the County as a whole. In many cases, the geographic area impacted by the hazard event was much larger than the County itself. For instance, 21 injuries were reported by the NCDC for temperature extremes for Adams County. These 21 injuries however were actually from one event between 53 other counties.

Table 7	Weather Hazard Events Recorded for Adams County (1966-2003)				
Event	Number of Events	Deaths	Injuries	Property Damage	Crop Damage
Drought	1	0	2	$0	$0
Flood	3	0	0	$867,000	$45,000
Hail	40	0	0	$269,000	$28,000
Lightning	3	0	0	$25,000	$0
Tornado	13	0	5	$3,153,000	$0
Wild/Forest Fire	1	0	0	$80,000	$0
Snow/Ice	22	0	21	$67,000	$0
Temperature Extreme	9	5	21	$0	$0
Thunderstorm/High Wind	67	1	8	$2,353,000	$82,000
Total	159	6	57	$6,814,000	$155,000

National Climatic Data Center

Because the NCDC data is not entirely comprehensive and indicative of the hazards that have occurred in the County, other sources of information were referenced. These sources included other plans and reports, documents from the Adams County Emergency Management Department, past local newspaper articles, the Wisconsin Department of Natural Resources (DNR), Wisconsin Emergency Management (WEM), and the National Weather Service.

VULNERABILITY ASSESSMENT

For each hazard identified, a summary of the impact on the community is given. When possible, the numbers of existing buildings, infrastructure and critical facilities located in the hazard areas are inventoried. Critical facilities are defined as facilities that are critical to the health and welfare of the population, and are especially important following hazard events. This can include a hospital, town hall, mobile homes, or a concentration of homes around a lake.

Where possible, an estimate of the potential dollar losses to vulnerable structures is given. Values are identified by tax assessments, equalized values, or statement of values from insurance companies.

Because Adams County is made up of local units of government, it is a requirement by FEMA is to assess each jurisdiction's risks for each hazard. Given that the County is not uniform in (but not limited to) land use, surface water, vegetation, and population concentration, certain areas in the County may be more vulnerable than other areas.

Hazard: Flooding

Hazard Analysis:

Major floods in Adams County tend to occur either in the spring when melting snow adds to normal runoff or in summer or early fall after intense rainfalls. Flooding which occurs in the spring due to snowmelt and/or a prolonged period of heavy rain is characterized by a period of days. This build up continues until the river or stream overflows its banks, for as long as a week or two and then slowly recedes inch by inch. The timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and protection of property.

Flooding is the most significant hazard in Adams County, particularly because it borders the Wisconsin River. As described in Part II, there are approximately 235 miles of streams in Adams County within five main watersheds. Four are part of the Wisconsin River Basin, while the Neenah Creek is part of the Upper Fox.

Floodplains exist along the Wisconsin River and the tributaries that feed into it. These floodplains are narrow along tributaries and lakes but extensive throughout the County. Floodplains are described in Part II and shown on Map 5 of this plan. The Federal Emergency Management Agency (FEMA) identified these floodplains on Federal Insurance Rate Maps (FIRMs), while the North Central Wisconsin Regional Planning Commission digitized them into a GIS coverage.

Prior to the construction of the reservoirs at Petenwell and Castle Rock, large-magnitude floods were recorded on the Wisconsin River in September 1911, July 1912, September 1938, September 1941, and April 1965. A maximum discharge of 72,200 cubic feet per second (cfs) was recorded on September 14, 1938, on the Wisconsin River near Wisconsin Dells just south of the Adams County line.

History of Flooding in Adam County:

Flooding was the principal cause of damage in five of seven Presidential Disaster Declarations in Adams County from 1971 to 2002. The most recent declaration at the time of this plan occurred in 2002 in northern Adams County where at least 15 inches of rain fell on the area June 21 and 22. Gov. Scott McCallum declared a state of emergency for Adams County and six other counties. Numerous roads were reported closed due to flooding. The risk of a dam failure was issued for areas along Lake Arrowhead, Lake Sherwood and Lake Camelot drainages. Runoff filled lakes to the point of nearly breeching the levees and embankments. Water had to be released into the drainage system to prevent levee and dike failures. In some locations the water flooded homes and businesses, washed out roads, bridges and culverts, and damaged crops. Estimated damage by NCDC to Adams County was about $577,000. The Town of Big Flats suffered major damage to roads, resulting in more than $195,000 in repair costs.

The Flood of 1993 was one of the worst flood events experienced by Adams County, the state, and entire Midwest. The flooding in Adams County was a result of several compounding factors including heavy rains and flooding in the fall of 1992, above average amounts of precipitation in the Spring of 1993, and unusually heavy amounts of rain onto already saturated ground from early June throughout July. Fortunately, before the flood peaks arrived on the Wisconsin River in Adams County, the Petenwell and Castle Rock Reservoirs were drawn down. This created additional storage capacity that helped ease flow and lowered discharges downstream.

East of the Wisconsin River in the County, there was substantial flooding reported near the border of the City of Adams and the Village of Friendship. The Health and Social Services Building, DNR Offices, Jr. High School, and numerous homes all experienced flooding and water damage. Standing water plagued the area for months afterward. Adams County received approximately $792,562 in disaster disbursements. The major impacts from flooding were to agriculture lands public roadway washouts. Nearly 50 percent of financial aid disbursements were for agriculture where wet croplands prevented normal farming operations and stunted or killed crops. Twenty percent of the funds were for public relief. High groundwater eroded road bases and caused excessive runoff that washed out culverts and embankments or stripped gravel surfaces off of town roads. In the private sector, the three most common problems were groundwater in basements, failing septic systems, and polluted wells.

Another flood event of note where Adams County received public assistance in was in 2000. On July 2, storms roared through the area. Flooding occurred in the southwest area of the county causing an estimated $25,000 in damage to residential structures and 400,000 to agriculture.

Vulnerability Assessment:
Flood events in the County have caused substantial property and infrastructure damage in the past, and have the potential to cause future damage. Looking at past events, the following have been significantly impacted by flooding:

- Infrastructure – flooded public facilities and schools
- Utilities - down electric lines/poles/transformers, telephone lines, lost radio communication
- Roadways – washouts, inundated roadways, debris clean-up
- Residential structures – flooded basements, damaged septic systems
- Businesses – loss of commerce
- Agriculture - inundated cropland

In order to assess the vulnerability of the Adams County area to flooding hazards, applicable basic inventory asset data described in Part II must be analyzed. For this purpose, special consideration should be given to structures (specifically critical facilities), infrastructure, and cropland.

One of the first reports to reference in assessing vulnerability to structures during flooding is the State of Wisconsin Repetitive Loss Report (updated in 2000). The Repetitive Loss Report provides information to the status of repetitive loss properties by community in Wisconsin. FEMA, through the Federal Insurance Administration (FIA), classifies a repetitive loss structure "when more than one flood insurance claim of at least $1,000 is made within a ten-year period". The information is used as floodplain management tool and to supplement information provided by communities for flood mitigation grants administrated WEM. According to the report, there are no local of units of government within Adams County contain existing repetitive loss structures.

With no structures in the County shown in the Repetitive Loss Report, structures within floodplains were analyzed. The floodplain boundaries (as well as the watershed boundaries) within Adams County are shown on Map 5 in Part II. These areas are generally located along the Wisconsin River and its major tributaries. Map 5 is based off the Adams County Flood Insurance Study of 1990. This study investigated the existence and severity of flood hazards in the County, including the Village of Friendship and

unincorporated areas. This study developed flood risk data for various areas of the communities that was used to establish actuarial flood insurance rates. It also assists the communities in its efforts to promote sound floodplain management.

The Adams County Flood Insurance Study is one of the few sources of scientific data available to determine the County's vulnerability to flood events. The Flood Insurance Study was used for one methodology for this Plan to determine the vulnerability to structures in the County. The following describes the methodology:

Methodology 1 – Structures within Floodplains:

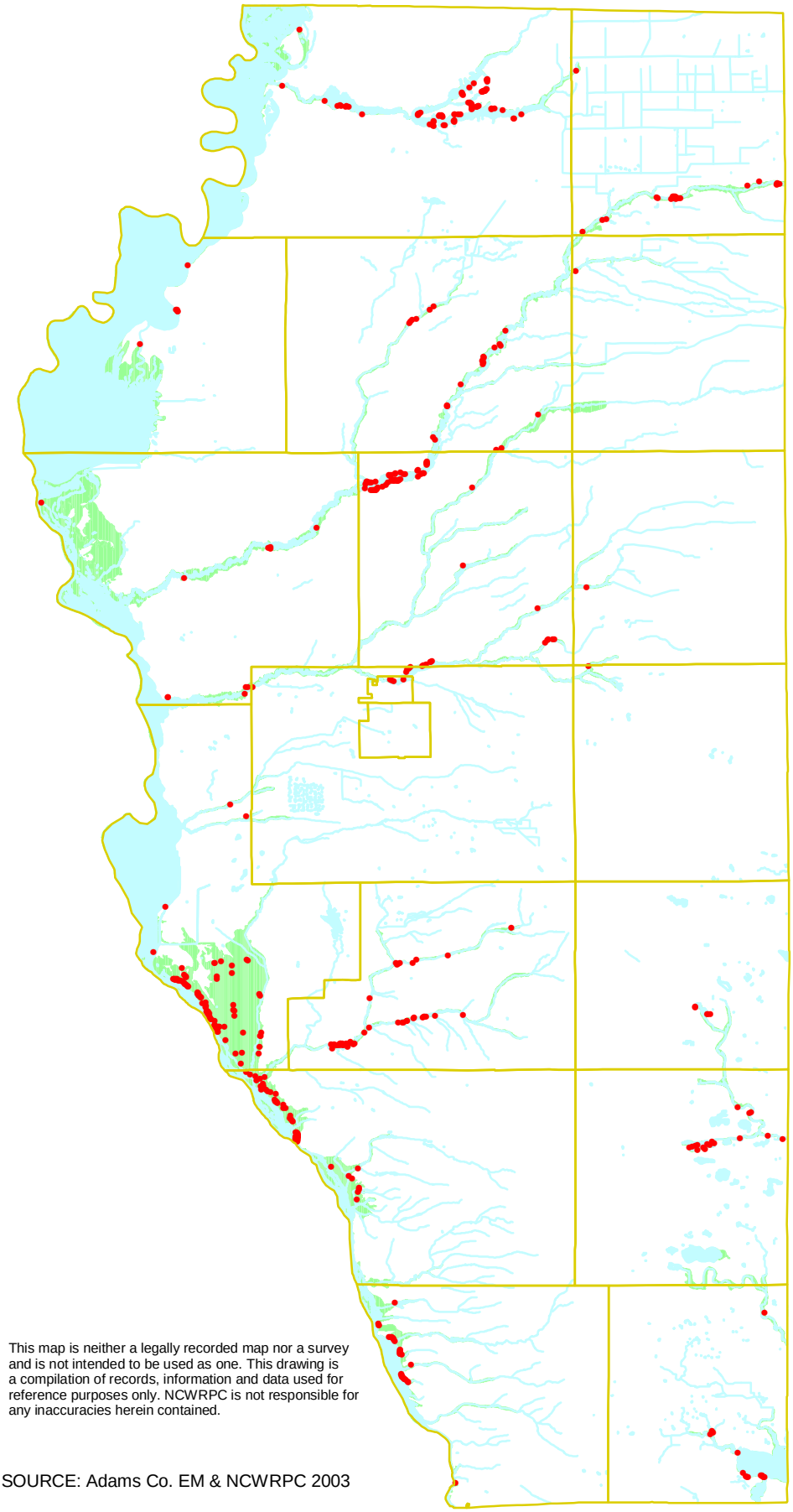
1. NCWRPC digitized (electronically traced) the individual FEMA FIRM floodplain maps into one GIS coverage for the County.
2. The floodplain GIS coverage then became an overlay over the USGS 7.5-minute quadrangular GIS coverage for Adams County. Since the USGS coverage shows the location of man-made structures, buildings identified within the floodplain boundary were determined "vulnerable" to flooding.
3. Those identified structures recognized as vulnerable were then verified/rectified on the digital aerial photos coverage.
4. Ownership of those structures was identified from the address point coverage.
5. Those parcels (with owners' names and addresses) were cross-referenced to the county's tax assessment database.
6. Improvement values (not assessed values) were counted for the identified vulnerable structures.

Table 8 and Map 11 shows the number of structures in municipality identified as "vulnerable to flooding" according to Methodology 1 in the floodplains. There were a total of 466 structures identified in the designated floodplain boundaries. The average value of a structure was $44,139. This does not include the 42 mobile homes located in the Point Bluff Mobile Home Park.

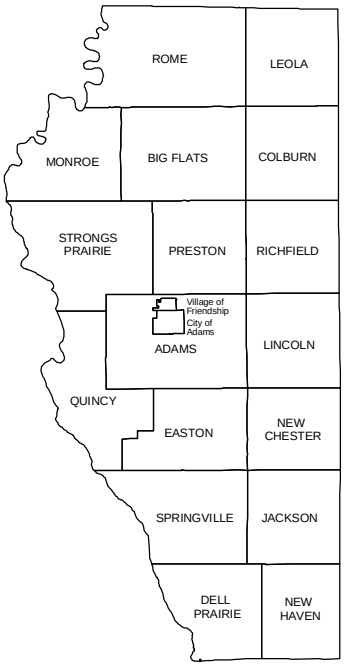
MAP 11

FLOOD VULNERABILITY METHODOLOGY 1

Adams County, Wisconsin



FLOODPLAIN
MINOR CIVIL DIVISIONS
STRUCTURES
WATER



NORTH

2 0 2 4 6 Miles

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Table 8	2001 Improvement Values* of Structures in Floodplains in Adams County		
Municipality	**Number**	**Sum Total**	**Average Value**
Adams town	5	$67,100	$13,420
Big Flats town	24	$518,900	$21,621
Colburn town	1	$500	$500
Dell Prairie town	24	$1,476,100	$61,504
Easton town	43	$1,354,200	$31,493
Jackson town	15	$952,400	$63,493
Leola town	19	$644,100	$33,900
Lincoln town	1	$12,900	$12,900
Monroe town	6	$341,600	$56,933
New Chester town	5	$127,800	$25,560
New Haven town	13	$548,800	$42,215
Preston town	68	$2,952,400	$43,418
Quincy town	84	$3,292,500	$39,196
Richfield town	1	$36,000	$36,000
Rome town	73	$6,133,400	$84,019
Springville town	34	$1,554,106	$45,709
Strongs Prairie town	10	$381,200	$38,120
Friendship village	4	$96,600	$24,150
Wisconsin Dells (part)	0	$0	$0
Adams city	0	$0	$0
Unknown	36	$78,000	$2,167
Adams County	466	$20,568,606	$44,139

Source: Adams County and NCWRPC

Since flooding occurs to areas outside the 100-year floodplain boundaries, a second methodology was used to determine the County's vulnerability to flood events. This includes structures out of the floodplain boundary based on inundated areas during past flood events.

In July of 1993, an Interagency Hazard Mitigation Team toured some of the counties in the Presidential Disaster Declaration. Adams County was one of six counties toured by the Team. The Team identified issues and recommendations based on these visits and developed the Interagency Hazard Mitigation Team Report. A recommendation (#25) was made specifically for the County in this report. The background for this recommendation states the following:

"Many communities in Wisconsin, e.g., Adams, Friendship, and Wautoma are located where there is a poorly defined drainage (surface runoff) network. During periods of extended rainfall and/or snowmelt, a general

condition of flooding exists throughout the communities. During this time, basements and roadways suffer considerable damage. This year the rainfall was so extreme that some buildings suffered first floor damage."

The following recommendation was made based off this finding:

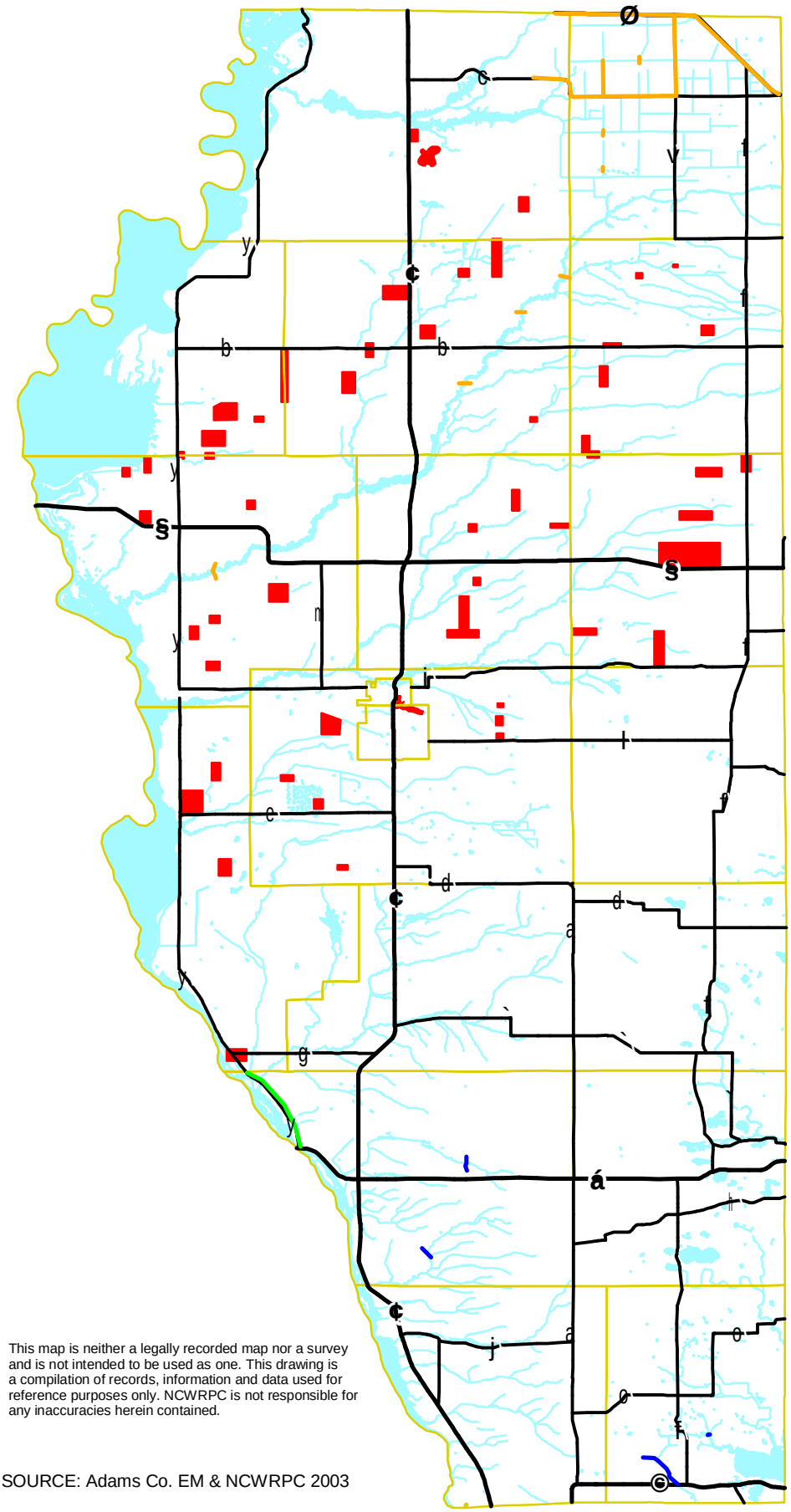
"Adams County should develop a long range plan that addresses 1) surface runoff problems, 2) needs including future replacements of bridges, culverts, roads, etc., and 3) land use regulations (future developments). Such a plan will require 1) an inventory of existing bridges, culverts, and storm sewers including frequency of overtopping or failure; 2) new topographical maps(county-wide) with 1- (preferred) or 2-foot contour intervals; and 3)updated hydrology data."

In response to this recommendation, the Long Range Flood Water Management Strategy for Adams County was developed in March of 1996. The report includes a flood damage assessment to public facilities and roadways among other things. This assessment depicts areas of flooding problems experienced during the Floods of 1993. It was suggested that these areas should be evaluated for flood storage zoning. The primary source used for identifying areas inundated by past flood events for Methodology 2 is from this report.

Methodology 2 – Flooding from past events:

1. NCWRPC re-digitized (electronically traced) the map by Mid State Associates, Inc as "inundated areas" from the Flood of 1993 from the Long Range Flood Water Management Strategy for Adams County .
2. The inundated areas from this 1993 GIS coverage then became an overlay over the USGS 7.5-minute quadrangular GIS coverage for Adams County. Since the USGS coverage shows the location of man-made structures, buildings identified within the inundated areas were determined "vulnerable" to flooding.
3. Those identified structures recognized as vulnerable were then verified/rectified on the digital aerial photos coverage.
4. Ownership of those structures was identified from the address point coverage.
5. Those parcels (with owners' names and addresses) were cross-referenced to the county's tax assessment database.
6. Improvement values (not assessed values) were counted for the identified vulnerable structures.

Map 12 illustrates the areas of the County that have been affected by flooding in the past, while Table 9 shows the number of structures



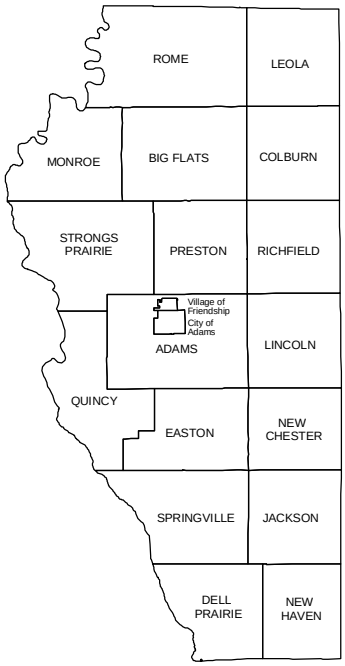
MAP 12

FLOOD VULNERABILITY METHODOLOGY 2

Adams County, Wisconsin

INUDATED / DAMAGED ROADWAYS
- 1993
- 2000
- 2002

1993 FLOOD INUDATED AREAS
MINOR CIVIL DIVISIONS
US & STATE HIGHWAYS
COUNTY HIGHWAYS
WATER



NORTH

2 0 2 4 6 Miles

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identified as "vulnerable to flooding" according to Methodology 2 in the inundated areas. There were a total of 358 structures identified in areas flooded in the past. The average improvement value of a structure was $24,414.

Table 9	Estimated Improvement Values in Inundated Areas in Adams County		
Event	Number of Structures	Average Improvement Value	Total
Structures	270	$30,742	$8,300,362
Known Mobile Homes	88	$5,000	$440,000
Total	358	$24,414	$8,740,362

Source: NCWRPC and Adams County

In addition to structural damage from past flood events, there has been significant damages to public roadways, particularly to roadway surfaces, culverts and ditches. Bridges are also affected from high water from rivers. Floods have inundated roadways in the County from a period of a few days to up to much as three months. Such interruptions in the County transportation network cause travel delays through detours. Map 12 includes roadways that have been affected by past events.

The primary impact from damages to roadways is to business. The monetary impact is unknown but past floods have restricted public access and have even closed businesses due to septic system problems resulting from the high water table. Since tourism is an important industry to the County, several campgrounds, lodges, and restaurants may be affected by flooding.

The agriculture industry is a sector that can face substantial losses. During floods, cool, rainy/wet, sunshine deficient climatic conditions of the spring and summer create a general condition of high water and saturated soils throughout the County.

Flood conditions can leave farmers with the following economic setbacks:

- Delayed planting (reduced growing season)
- Prevention of fields from being seeded
- Seed and agricultural chemicals washing out of fields
- Rotting of plants due to excess moisture
- Areas where planted crops left in the fields due to excessive moisture
- Crops not reaching full maturity or stunted growth
- Requirements by farmers to expend higher amounts of money on additional soil amendments

- Lower quality (nutritional value) of harvestable crops as a feed source.

Reductions in quantity can result in loss of revenues from cash crops and increased expenses for purchasing the needed livestock feed from outside sources. Additionally, reductions in crop quality result in lower prices received for cash crops and increased amounts spent for nutritional supplements to animal feed, which need to be added even in much of the purchased feed.

The saturated soil conditions responsible for these woes are generally throughout the County. Agricultural land in Adams County is primarily located in the eastern third of County. Additional ag-areas are found on the western side in the Towns of Strongs Prairie and Quincy. These farming areas are flat sands with shallow ground water tables and difficulties with drainage due to lack of slope.

Economic losses to farmers can generate a ripple affect to the local community as well. Reduction in farm income will curtail the farmers' ability to purchase new equipment and make other improvements. Farmers will have less money to spend at farm dealers, farm supplies, building/hardware suppliers, fertilizer, feed and seed dealers, and other agribusiness and retail establishments. The State itself will have reduced tax revenues. Farmers will have less money to save and invest, and suffer still more increases in debt load.

The forest products industry is affected similarly to agriculture. Forest lands become too wet for logging operations and many water logged tree plantations suffer high mortality rates.

Future Probability and Potential Dollar Losses – Flood:
Based on the historic data presented here (frequency of past events), Adams County can expect a significant flood event about every 6.2 years on average. This equates to a probability of 0.16 or about a 16 percent chance in a given year. The spacing between the 1993 and 2000 flood events supports this estimate. Although a look at more recent history, i.e. the 2000 flooding being quickly followed by flooding again in 2002, might indicate an increasing probability of flood, this is most likely an anomaly rather than a sign of increasing probability of flood.

Historic data is again used to estimate potential future dollar losses due to flood. Based on the last three flood events for which we have fairly good loss figures, Adams County can anticipate losses of approximately $600,000, on average, between the public and private sector for each

significant flood occurrence. Over the next ten-year period, flood losses in Adams County could approach $1 million.

Hazard: Dam Failures

Hazard Analysis:
A dam can fail for a number of reasons such as excessive rainfall or melting snow. It can also be the result of poor construction or maintenance, flood damage, earthquake activity, weakening caused by burrowing animals or vegetation, surface erosion, vandalism or a combination of these factors. Dam failures can happen with little warning resulting in the loss of life and significant property damage in an extensive area downstream of the dam.

There are 55 dams in Adams County and along the Wisconsin River (See Map 4). These dams serve many useful purposes including agricultural uses, providing recreational areas, electrical power generation, erosion control, water level control and flood control. According to the DNR, Adams County has 24 large dams (including Castle Rock and Petenwell Dam), which have a structural height of over 6 feet and impounds 50 acre-feet or more. The other 31 are regarded as small dams. The Wisconsin DNR regulates all dams on waterways to some degree, however the small dams are not stringently regulated for safety purposes. The federal government has jurisdiction over large dams that produce hydroelectricity. Castle Rock and Petenwell Dams are the major producers of hydroelectricity in Adams County. Privately owned Friendship and Big Roche-A-Cri also produce electricity.

The WDNR assigns hazard ratings to large dams within the state. When assigning hazard ratings, two factors are considered: existing land use and land use controls (zoning) downstream of the dam. Dams are classified into three categories that identify the potential hazard to life and property downstream should the dam fail. A high hazard indicates that a failure would most probably result in the loss of life. A significant hazard indicates a failure could result in appreciate property damage. A low hazard exists where failure would result in only minimal property damage and loss of life is unlikely. For Adams County, there are four dams that have a high hazard rating –Castle Rock, Lake Camelot, Lake Petenwell, Peppermill Lake, and Fawn. Sherwood and Big Springs have a significant rating, while the rest are rated low.

All dams perceived as posing a threat to downstream development should have a dam failure analysis performed in order to identify the

hydraulic shadow (that area of land downstream from a dam that would be inundated by water upon failure of the dam during a regional flood). This information can be used to develop an Emergency Action Plan (EAP) for the dam. This EAP includes provisions for notifying emergency authorities for assistance and warning affected downstream residents if the potential for failure exists.

History of Dam Failures in Adams County:

Adams County has not experienced a dam break with any loss of life or substantial property damage. However, the recent Marquette County dam blowout in Michigan's Upper Peninsula is a prime example of the kind of destruction a dam failure can cause. On May 15, 2003, an earthen dike washed away after heavy rainfall. The preliminary damage was estimated at $102 million. It washed away $3 million worth of roads and bridges, plus 20 homes, and sent a massive plume of sediment into Lake Superior. It was a serious blow to the economy of Marquette County, hurting basic industries and tourism.

The Town of Rome dodged dam blowouts in the June of 2002 Flood when the Lake Camelot came within an inch of failure; Lake Arrowhead dam came within seven inches of failure; and Sherwood was more than four inches away from failure. Had it not been for the efforts of many volunteers sandbagging near roaring culverts, these dams could have given.

A small earthen dam was breached in the Greenbush Areas Subdivision located in the Town of Preston during the 1993 Flood. The failure caused flooding in several homes. The washout was filled in and riprap was installed to protect the dam. The total cost was $2,375.

Table 10	Dams in Adams County				
DAM NAME	DAM SIZE TYPE	MILES NEXT CITY IS DOWN FROM DAM	NAME OF NEXT CITY DOWN FROM DAM	HAZARD RATING	UPDATED EAP YEAR
CASTLE ROCK	LARGE	19	WISCONSIN DELLS	HIGH	2001
LAKE CAMELOT	LARGE	0	LAKE SHERWOOD SUBDIV	HIGH	2003
LAKE PETENWELL	LARGE	1	DELLWOOD SUBDIVISION	HIGH	2001
PEPPERMILL LAKE (Coddington)	LARGE	4	OXFORD	HIGH	
SHERWOOD	LARGE	0	LAKE SHERWOOD SUBDIV	SIGNIFICANT	2003
BIG SPRINGS	SMALL	1	BIG SPRINGS	SIGNIFICANT	
#10 (White Creek)	LARGE			LOW	
ARKDALE	LARGE	0	ARKDALE	LOW	
BINGHAM CR 1 CECIL BROWN ETUX	SMALL	35	WISCONSIN DELLS	LOW	
CARTER CREEK (Splitek)	LARGE	0	NONE	LOW	
EASTON	LARGE	0	EASTON , CTH A	LOW	1990
FARREY (McGinnis Lake)	LARGE	2	BROOKS	LOW	
FEDLER	LARGE	0	NONE	LOW	
FRIENDSHIP	LARGE	0	FRIENDSHIP	LOW	
HORNER (Fawn Lake)	LARGE	0	NONE	HIGH	
LAKE ARROWHEAD	LARGE	0	ROME	LOW	2003
LANDIS,CHARLES	SMALL	9	FRIENDSHIP	LOW	
LAVERNE NEWBY (White Creek)	SMALL	1	WHITE CREEK	LOW	
LEOLA 16	LARGE	17	NEW ROME	LOW	
LEOLA 19	LARGE	15	NEW ROME	LOW	
LEOLA 4	LARGE	14	NEW ROME	LOW	
LEOLA 9	LARGE	12	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	17	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	15	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	13	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	12	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	13	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	15	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	16	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	18	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	14	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	14	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	16	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	17	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	15	NEW ROME	LOW	
LEOLA DRAINAGE DISTRICT	SMALL	16	NEW ROME	LOW	
MR NERO (Risk Creek)	SMALL	4	WHITE CREEK	LOW	
NO. 9A	LARGE			LOW	
NORTHERN DAM OR #9 (White Creek)	LARGE			LOW	

Table 10 continued	Dams in Adams County				
ROCHE-A-CRI / COTTONVILLE (Big Flats)	LARGE	4	ARKDALE	LOW	
SCHWAHN	LARGE	0	NONE	LOW	
SOUTHERN DAM OR #8 (White Creek)	LARGE			LOW	
WALKER, HARRY	LARGE	9	PLAINFIELD	LOW	
BINGHAM CR 2 CECIL BROWN ETUX	SMALL				
EVANS, ORVEL	SMALL				
HENNING,H.A.	SMALL				
HENRY REEVES,ETUX	SMALL				
HOLM, HAROLD	SMALL				
HYLER,DONALD	SMALL				
JOHN KISH & ED KUBACKI	SMALL				
KOHL, KARL	SMALL				
RANDORF,CLAYTON	SMALL				
RICHARD E BIERI	SMALL				
SCIEPKO, JOSEPH	SMALL				
SUS, EDWARD	SMALL				

DNR's on-line database and NCWRPC

Vulnerability Assessment:

Adams County has five dams within it boundaries that have a high hazard rating, and two that have significant hazard rating. Only four of these six dams have an Emergency Action Plan – Lake Camelot, Lake Sherwood, Castle Rock, and Lake Petenwell.

Tri-Lakes EAP (Lake Camelot, Sherwood, Arrowhead Dams)

Adams County Land and Conservation Department produced one EAP for Lake Camelot and Lake Sherwood, along with Lake Arrowhead, which has a low hazard rating. This plan was updated in 2003. The EAP was based off a hydrologic, hydraulic, and stability analysis completed by R.A. Smith & Associates in March of 1992. The dam failures in this analysis for all three dams were analyzed independently of each other, which assumed a scenario that only one dam would fail at a time. The "worst-case" failures for each of the dams were determined to occur due to piping failures when the maximum water surface elevation was reached during a 100-year storm event.

The study determined that a hypothetical 100-year, 24-hour duration storm event occurring throughout the watershed would reach the series of lakes in less than 10 hours. It was estimated that the time for complete failures to occur on the Lake Camelot, Lake Sherwood, and Lake Arrowhead Dams would be 2.69 hours, 1.17 hours, and 2.07 hours,

respectively. In addition, evaluations were performed to determine the 100-year water surface elevations assuming two flood scenarios: 1) where the dams would remain intact, and 2) where the dams were considered individually nonexistent along the entire reach of the Fourteen Mile Creek and Spring Branch Creek between the Wisconsin River and 8th Avenue. After the computer analysis for each dam were completed, field surveys of homes and properties potentially affected by the 100-year storm event scenarios were performed between the same limits. Map 13 contains the number and locations of the property owners in hazard areas. The hazard rating and specific study results for each dam are summarized as follows:

-Lake Camelot Dam

During a regional flood, the 100-year water surface elevation for Lake Camelot, assuming the upper or lower dam did not fail, was calculated to be 1014.92 National Geodetic Vertical datum (NGVD). This elevation was established by determining the amount of runoff that would be produced within the watershed and flood routing the flow entering the lake through the principle spillway (morning glory) in the Lower Lake Camelot Dam. Based on this information, several homes with exposed basements were determined to have entry elevations below the 100-year floodplain. The affected homeowners should be notified of their situation and may want to consider removing their homes from the floodplain or obtaining flood insurance.

The effects to homes located on Lake Sherwood were evaluated during a 100-year storm event assuming a "worst case" failure of the Lower Lake Camelot Dam occurred in comparison to the results of the dam nonexistent and dam intact floodplain scenarios. The computer results determined the Lake Sherwood Dam would not overtop and the maximum water surface elevations on Lake Sherwood for Camelot dam failure and dam intact scenarios would be elevation 999.05 and elevation 995.55, respectively. However, the results concluded that a "worst case" failure of the lower dam would inundate 28 or more homes on Lake Sherwood. This means that some homes do not conform to current State floodplain regulations because lowest entry elevation (elevation 994.33) are below the 100-year floodplain elevation established for Lake Sherwood (elevation 995.55). Therefore, the Lake Camelot Dam was assigned a hazard rating of Class 3, High Hazard. At a minimum, the affected property owners should be notified of their situation.

-Lake Sherwood Dam

The 100-year dam failure and dam nonexistent profiles were analyzed for the Lake Sherwood Dam. The results of the analyses show that the failure

MAP 13

TRI - LAKES DAM VULNERABILITY

Adams County, Wisconsin

LARGE DAMS

4 NUMBER OF STRUCTURES IN DAM HAZARD AREAS

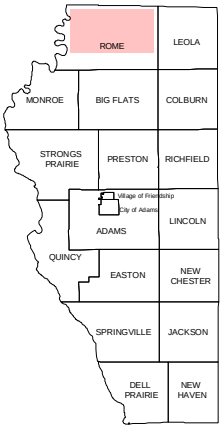
WATER

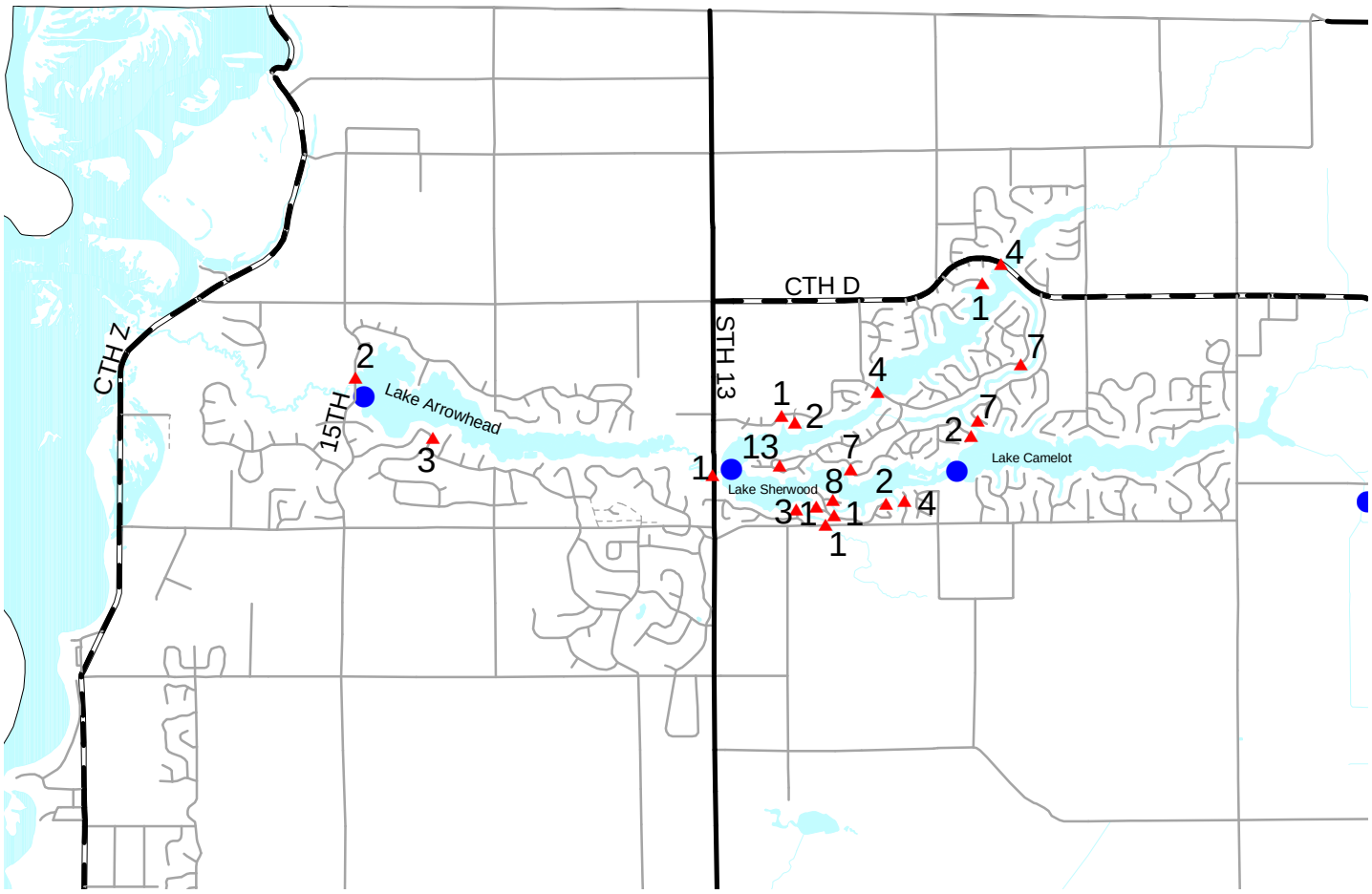
US & STATE HIGHWAYS

COUNTY HIGHWAYS

LOCAL ROADS

PRIVATE ROADS





NORTH

0.5 0 0.5 1 1.5 Miles

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would inundate some homes located on Lake Arrowhead, which would not flood if the Lake Sherwood Dam were to remain intact, or be nonexistent. This means that the lowest entry elevations of this one home lies between the Lake Sherwood's dam failure flood shadow elevation (972.96) and the 100-year floodplain elevation (967.01) of Lake Arrowhead. Therefore, the Lake Sherwood Dam was assigned a hazard rating of Class 2, Significant Hazard. In addition, a complete failure of the Lake Sherwood Dam would inundate and overtop S.T.H. 13, 15th Avenue over the Lake Arrowhead Dam, and C.T.H. Z roadways making them unusable and potentially creating failure to these roadways and subsequently causing another hazardous situation of life loss and public safety.

-Lake Arrowhead Dam

The 100-year dam failure, dam intact and dam nonexistent profiles downstream from the Lake Arrowhead dam do not inundate any existing campgrounds; however, some homes would be affected. The low-lying areas, valley width, and undeveloped land allow for the Lake Arrowhead Dam to be assigned a Class 1A, Low Hazard rating. However, a complete dam failure event of Lake Arrowhead would inundate C.T.H. Z.

There were 80 structures listed in hazard areas for the Tri-Lakes EAP. Table 11 lists the number of structures and the total improvement value.

Table 11	**Improvement Value of Structures in Dam Failure Hazard Areas for Three-Lakes Area (2001)**		
Lake	**# of Structures**	**Total Improvement Value**	**Average Value**
Lake Arrowhead	4*	$232,300	$58,075
Lake Camelot	28	$2,706,900	$96,675
Lake Sherwood	46	$4,512,300	$98,093

*=2 additional structures were listed, but did not have an improvement value listed

Source: Adams County and NCWRPC

Castle Rock and Petenwell Dam

Wisconsin Public Service Corporation produced individual EAPs for Lake Petenwell and Castle Rock Lake dams. Both plans were updated in 2003. Inundation maps within this plan illustrate two types of floods. The worst flood condition mapped is the Inflow Design Flood (IDF). This flood might occur if the dam failed during an already high flow period. The second

flooding condition is the Sunny Day Failure. This is a dam failure at an unexpected time, not necessarily during a high flow period.

To understand the area that would be flooded, NCWRPC digitized the inundation maps from both EAP's to produce a GIS coverage, Map 14. For the purposes of this plan, the IDF and Sunny Day Failure were not defined, where the EAPs specifically delineated these areas. Unlike the EAP for the Tri-Lakes Area, property owners in hazard areas were not identified within the EAP. Therefore, structures and their values in the hazard areas cannot be obtained in an efficient manner for this plan.

In the event of failure for the four dams that have an approved EAP, procedures for warning and evacuating residents and visitors from flood prone areas are documented in each EAP. Each EAP has a Notification Flow Chart listing the "chain of command" and sequences of notification to be followed.

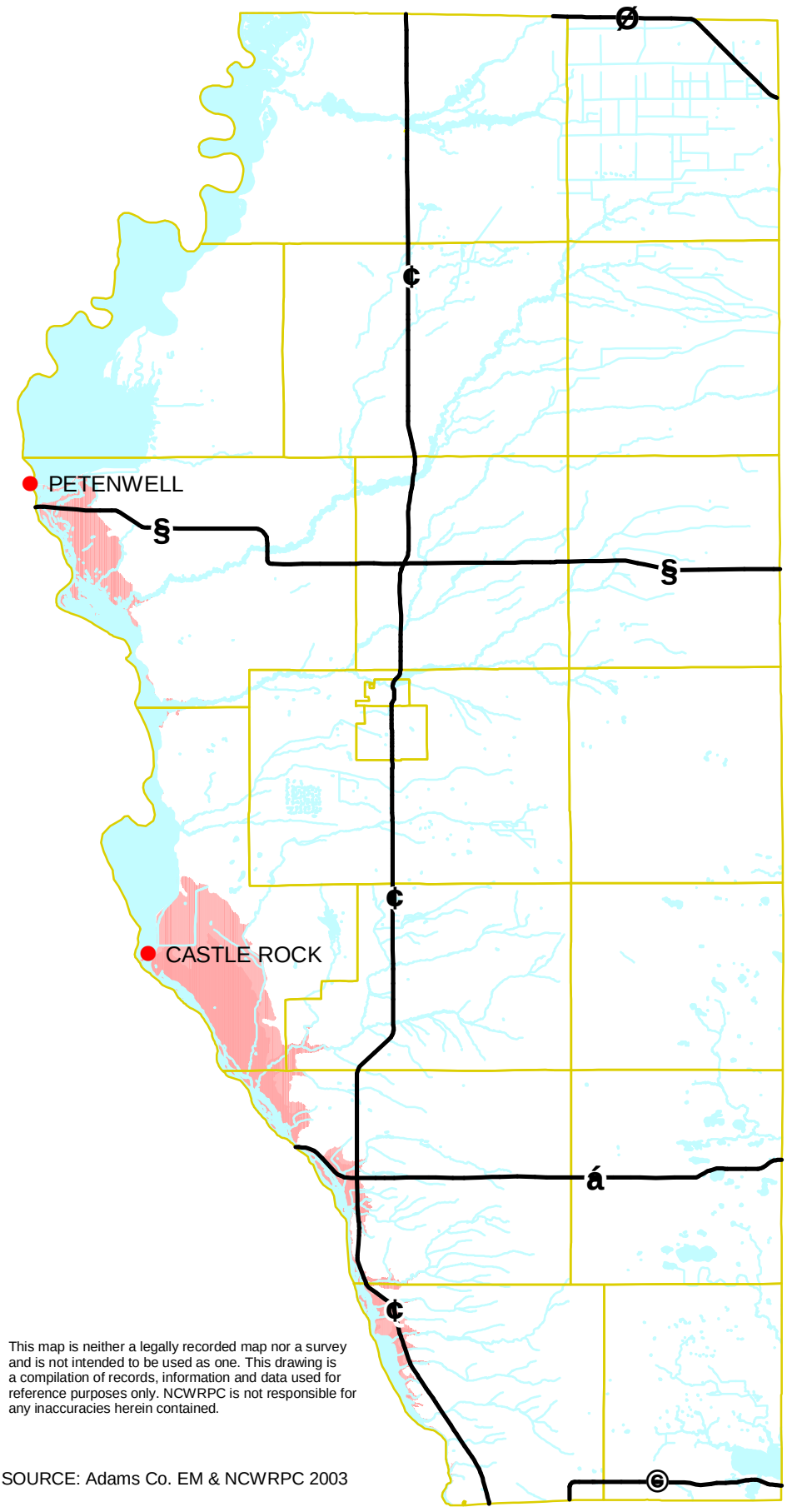
Future Probability of Potential Dollar Losses - Dam Failure:
Due to the significant number of dams and particularly large dams with high hazard ratings, dam failure is an important hazard event to plan for in Adams County. However, based on past experience, the actual probability of a major dam failure is very low. Considering the near failure of the Lake Camelot Dam in 2002 in conjunction with historic flood frequency data, probability of dam failure might be estimated at (less than) 0.03 or 3 percent chance in a given year, although this is not completely accurate, since failure of the dam was avoided by human intervention.

Estimating future dollar losses for dam failure is problematic as well. Had the Lake Camelot Dam actually failed, the 28 structures in the failure hazard area would have been inundated and many destroyed. Total value of these structures is $2,706,900. Table 11 shows potential losses from failure of Arrowhead, Camelot and Sherwood dams.

MAP 14

PETENWELL - CASTLE ROCK INUDATED AREAS

Adams County, Wisconsin



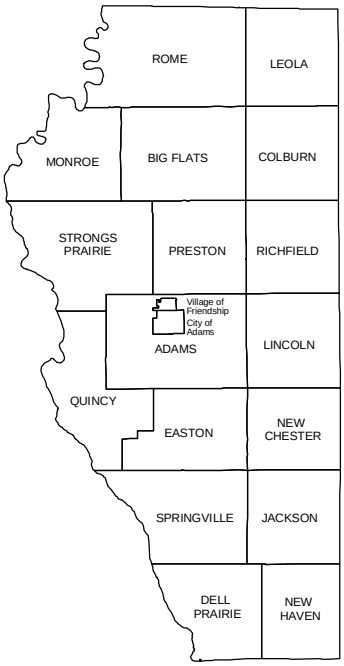
US & STATE HIGHWAYS

MINOR CIVIL DIVISIONS

WATER

INUDATED AREAS

DAM LOCATIONS



NORTH

2 0 2 4 6 Miles

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SOURCE: Adams Co. EM & NCWRPC 2003

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Hazard: Severe Thunderstorms

Hazard Analysis:
The National Weather Service definition of a severe thunderstorm is a thunderstorm event that produces any of the following: downbursts with winds of 58 miles per hour or greater (often with gusts of 74 miles per hour or greater), hail ¾ of an inch in diameter or greater or a tornado. Strong winds, hail, and lightning will be addressed in this section, however tornadoes will be referenced separately.

Thunderstorms frequency is measured in terms of incidence of thunderstorm days or days on which thunderstorms are observed. Wisconsin averages between 30 and 50 thunderstorm days per year depending on location. A given county may experience ten or more thunderstorm days per year. The southwestern area of the state normally has more thunderstorms than the rest of the state.

History of Severe Thunderstorms in Adams County
One recorded death and eight injuries have resulted in association with severe thunderstorms in the area since 1980. Four of the seven requests for a Presidential Disaster Declaration for Adams County have been associated with severe storms since 1971. The most recent occurrence happened on June 11, 2001when a line of thunderstorms with many of the same characteristics as a tropical storm ripped through east central and west central Wisconsin. The thunderstorm complex produced hurricane-strength wind gusts and hail, resulting in thousands of downed trees and damage to structures. In Adams County, trees were uprooted and several trees and limbs fell on rural roadsides, leaving debris laying over public roadways and causing safety and hazardous conditions due to high wind driven rains. Power lines were also down causing blackouts. In the Town of New Chester, the siren was knocked out by to lightning.

On September 1, 2000, winds estimated at 75 mph completely destroyed one mobile home, while flipping another on its top south of the Adams/Friendship area. Two small children and an elderly woman sustained minor injuries. There were numerous large trees blown down nearby and west of Highway 13. NOAA listed this event number six out of the top 10 weather events in 2000 for the southeast Minnesota, northeast Iowa, and western Wisconsin Region.

In May of 2000, law enforcement officials and spotters reported hail the size of quarters, half-dollars and golf balls in Friendship. The hail caused extensive damage to vehicles, with insurance claims of over $300,000.

Based on past reported events from the National Weather Service, from 1971-2002 Adams County has experienced hurricane force winds of 75 mph or higher (Category 2 Hurricane type winds) eight times which is slightly above the average for the state. With these past events in mind, the county has a 25 percent chance in a given year of experiencing winds of this magnitude.

The historical frequency for the occurrence of hail is much greater. Based on reported events of the past 31 years, the county averages 0.77 periods of hail per year. Size ranges from .75 to 1.75 inches in diameter.

Vulnerability Assessment:

The National Weather Service can forecast and track a line of thunderstorms that may be likely to produce severe high winds, hail, and lightening but where these related hazards form or touch down and how powerful they might be, remains unpredictable. The distribution of thunderstorms and related hazard events have been widely scattered throughout the County.

Many thunderstorm events (without tornadoes) have caused substantial property and infrastructure damage, and have the potential to cause future damage. In order to assess the vulnerability of the Adams County area to thunderstorms and related storm hazards, a review of the past events indicate significant impacts to:

- Infrastructure – hospitals, schools, street signs, police and fire departments
- Utilities - electric lines/poles/transformers, telephone lines, radio communication
- Transportation – debris clean-up
- Residential - mobile homes, garages, trees and limbs, siding, windows
- Businesses – signs, windows, siding, billboards
- Agricultural - buildings, crops, livestock
- Vehicles – campers, boats, windshields, body, paint

According to the NCDC, historic thunderstorm events with associated high wind averages $2,347 in property damage, and $16,400 in reported crop damage. Historic thunderstorm events with associated hail that reported property damage averaged $26,900, and $9,300 in events that reported crop damage. Historic thunderstorm events with associated lightening that reported property damage averaged $8,300.

Based on review of the historic patterns of thunderstorms associated with high wind, hail, or lightening, there are no specific municipalities that have unusual risks. The events are relatively uniform and a countywide concern.

Future Probability and Potential Dollar Losses - Severe Thunderstorms:
Frequency data from the National Weather Service indicates that the probability of a thunderstorm with damaging winds occurring in Adams County is slightly higher than average for the State of Wisconsin. There is a 25 percent chance in a given year of a thunderstorm with damaging winds occurring in Adams County. This equates to about once every 4 years. The probability of a thunderstorm with damaging hail (0.75 inch diameter or greater) is higher in Adams County at 0.77 or 77% chance in a given year. The probability of a storm severe enough to warrant a Presidential Disaster Declaration is 0.13, or a 13 percent chance in a given year.

Historic data is again used to estimate potential future dollar losses due to severe thunderstorms. In Adams County, severe thunderstorms have averaged damages of $18,747 for high wind events and $36,200 in hail events. Over the next ten-year period, losses associated with severe thunderstorms in Adams County could approach $330,000.

Hazard: Tornados

Hazard Analysis:
U.S. tornados are classified into six intensity categories, named F0-F5. These categories are based upon the estimated maximum winds occurring within the funnel. The Fujita Tornado Scale (or the "F Scale") has subsequently become the definitive scale for estimating wind speeds within tornados based upon the damage done to buildings and structures. It is used extensively by the National Weather Service in investigating tornados (all tornados are now assigned an F scale), and by engineers in correlating damage to building structures and techniques with different wind speeds caused by tornados. Though the Fujita scale itself ranges up to F12, the strongest tornadoes max out in the F5 range (261 to 318 mph).

Table 12	Tornado Wind and Damage Scale		
Tornado Scale	Wind Speeds	Damage	Frequency of Occurrence
F0	40 to 72 MPH	Some damage to chimneys, TV antennas, roof shingles, trees, and windows.	29%
F1	73 to 112 MPH	Automobiles overturned, carports destroyed, trees uprooted	40%
F2	113 to 157 MPH	Roofs blown off homes, sheds and outbuildings demolished, mobile homes overturned.	24%
F3	158 to 206 MPH	Exterior walls and roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests and farmland flattened.	6%
F4	207 to 260 MPH	Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.	2%
F5	261 to 318 MPH	Homes leveled with all debris removed. Schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone. Top stories demolished	Less than 1%

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornados, called "tornado alley" by some, which extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Broadly speaking, the southern and western portions of Wisconsin have a higher frequency of tornadoes, however Adams County is not part of this area.

History of Tornados in Adams County:

Adams County has had 19 verified tornados from 1971 to 2002 (Table 13). The most recent was one of most fatal and damaging in the County. In August of 1994, a F3 tornado tore a 13-mile long, ¼ wide swath through Adams County. Two people were killed and 22 people injured by this tornado. Damage was estimated at $4.5 million with 24 homes, a tavern, a potato warehouse, and numerous out buildings destroyed. Eight homes suffered major damage, and 160 were reported to have light to moderate damage, primarily in the Town of Big Flats. In addition, the Big Flats Fire Department and town hall were destroyed, as well as a thrift shop. Seventy cows were crushed to death in one barn as the walls blew out and the upper floor, filled with 16,000 bales of hay and roof collapsed.

The largest and deadliest recorded tornado occurred a century ago in 1903 in the Town of Rome. A large F4 tornado apparently formed over extreme northern Adams County and then moved east-northeast passing

1.5 miles south of Bancroft in Portage County. The tornado was up to a half mile wide but most of the damage was in Portage County. Five people were killed and forty were injured by this tornado.

Only the 1994 and 1903 tornadoes have caused deaths, however several others have caused significant damages. The July 10, 1984, a F2 tornado that touched down in the Dellwood subdivision near Castle Rock Lake hit 59 homes and destroyed 14. More than 2,000 trees were downed.

Table 13 Reported Tornados in Adams County

Date	Time	Location	Other Counties Affected	Length (miles)	Width (yards)	Deaths**	Injuries**	F-Scale
8/27/94	2210 CST	Plainville 1SE	None	0.1	25	0	0	F0
8/27/94	2041-2057 CST	Monroe Center 2SE	None	10.5	850	2	22	F3
6/8/93	1635 CST	Adams 8E	None	0.5	25	0	0	F0
6/8/93	1630 CST	Adams 7ESE	None	2	75	0	0	F0
6/8/93	1552 CST	Rome 1SE	None	1.5	75	0	0	F0
6/8/93	1548 CST	Rome 2.5W	None	1	50	0	0	F0
6/8/93	1330 CST	Brooks 1N	None	1.5	75	0	0	F0
8/29/92	1900 CST	Big Flats 3.5E	None	5	100	0	0	F1
5/24/89	1730 CST	Adams 5W	None	0.5	50	0	0	F0
7/10/84	1551-1553 CST	Castle Rock	None	4	500	0	0	F2
4/2784	1410 CST	Brooks 3S	None	2	220	0	0	F1
7/3/83	1900 CST	Lake Mason	None	0.1	10	0	0	F0
7/3/83	1845 CST	Plainville	None	0.1	12	0	0	F0
7/3/83	1803 CST	Dellwood	None	6	50	0	0	F1
7/19/80	2345 CST	T. Quincy & T. Adams	None	2	?	0	0	F2
5/18/79	1645 CST	southeast Adams Co.	None	0.1	35	0	0	F1
4/17/75	2145 CST	Leola	None	0.3	20	0	0	F0
6/9/74	1430 CST	Highway 73 & CTH 1	None	?	?	0	0	F1
5/18/71	1640 CST	Adams-Friendship to Hancock	Waushara	15.9	100	0	5	F1
5/8/64	1815 CST	Lyndon Station 3NW to Adams	Juneau	23.5	150	0	0	F2
6/25/34	2330 CST	Briggsville	None	1.5	880	0	0	?
10/3/03	1600 CST	Rome 5E	Portage	22	200	5	40	F4

* The data in this table came from ***Storm Data, Significant Tornadoes--1680-1991*** by Thomas P. Grazulis, and ***Wisconsin Tornado Database 1950-2000*** Geographic Techniques Report No. ST-WTDB01.
** Injuries and Deaths are for the entire tornado track.

Vulnerability Assessment:

Though Adams County is mostly a rural county, there are concentrations of population scattered throughout County. Subdivisions, communities, and the Adams/Friendship area can be regarded as vulnerable because

these areas pose more of a threat to human safety and property damage. Map 15 illustrates these areas with in the County.

Mobile homes are of significant concern in assessing the hazard risks from tornados. In general, it is much easier for a tornado to damage and destroy a mobile home than standard constructed houses and buildings. Since 27 percent of Adams County's housing units are mobile homes, vulnerability to health and safety along with property damage is much greater. Research by the NWS shows that between 1985 and 1998, 40 percent of all deaths in the nation from tornados were in mobile homes, compared to 29 percent in permanent homes, and 11 percent in vehicles.

The 2000 U.S. Census reported there are 3,748 mobile homes in Adams County. While mobile homes are scattered throughout the County, many or concentrated in mobile home parks. Map 15 displays the location of the mobile home parks. Table 14 below lists the number of mobile homes reported by the Census for each municipality in the County. It also lists the personal property valuations for the mobile homes in each municipality. Owners of these mobile homes do not own the land but rather rent or lease the land it resides on. In most cases, these are in mobile home parks. The total personal property valuations of the all the mobile homes for each municipality was totaled and divided by the number of mobile homes with personal property valuations. The County average for personal property of those mobile homes was $11,937.

MAP 15

TORNADO VULNERABILITY

Adams County, Wisconsin

US & STATE HIGHWAYS

COUNTY HIGHWAYS

MINOR CIVIL DIVISIONS

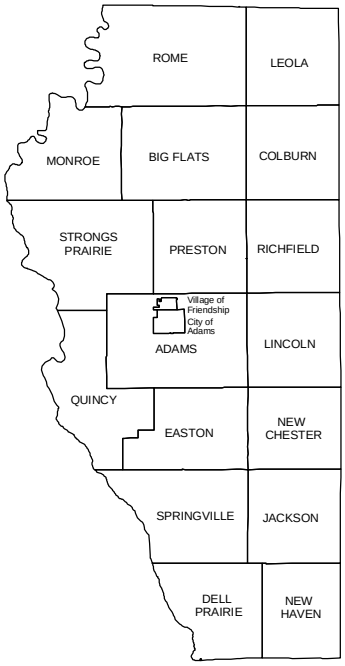
WATER

MOBILE HOME PARKS

- 6 - 10
- 11 - 30
- 31 - 50
- 51 - 87

CAMP GROUNDS

POPULATION CONCENTRATIONS



NORTH

2 0 2 4 6 Miles

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SOURCE: Adams Co. EM & NCWRPC 2003

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Table 14	Personal Property Valuations of Mobile Homes in Adams County (2003)			
Municipality	**2000 Census***	**Number****	**Total Value**	**Average Value**
Adams town	284	89	$973,800	$10,942
Big Flats town	292	12	$122,800	$10,233
Colburn town	53	0	$0	$0
Dell Prairie town	213	0	$0	$0
Easton town	379	62	$822,800	$13,271
Jackson town	255	24	$443,700	$18,488
Leola town	54	4	$65,000	$16,250
Lincoln town	33	0	$0	$0
Monroe town	122	9	$139,300	$15,478
New Chester town	235	8	$87,100	$10,888
New Haven town	75	7	$114,000	$16,286
Preston town	276	4	$23,100	$5,775
Quincy town	592	110	$1,712,800	$15,571
Richfield town	21	1	$23,700	$23,700
Rome town	230	1	$8,800	$8,800
Springville town	326	86	$449,600	$5,228
Strongs Prairie town	191	4	$41,500	$10,375
Friendship village	29	3	$33,200	$11,067
Wisconsin Dells (part)	0	0	$0	$0
Adams city	88	0	$0	$0
Adams County	3,748	424	$5,061,200	$11,937

*=Number of mobile homes reported in 2000 Census

**=Number of assessed mobile homes by municipality on rented/leased land

Source: Adams County and NCWRPC

Besides mobile homes, there are many other areas vulnerable to tornados such as campgrounds. Like mobile homes parks, campgrounds are of concern in the County because often times there is a concentration of people in them and there is little shelter provided. Map 15 also shows the location of campgrounds in the County.

The following is a list of things that may be affected by a tornado. Much of this list can be referenced in Part II.

- Community facilities – hospitals, schools
- Public Service - police and fire departments
- Utilities - power lines, telephone lines, radio communication
- Transportation – debris clean-up
- Residential – nursing homes, garages, trees and limbs, siding, windows, trees

- Businesses – signs, windows, siding, billboards
- Agricultural - buildings, crops, livestock

Based on review of the historic events of tornados, there are no specific areas in the county that have unusual risks. The events are relatively uniform and a countywide concern.

Future Probability and Potential Dollar Losses – Tornados:
Based on the historic data presented here, Adams County can expect a tornado about once every 1.6 years on average. This equates to a probability of 0.61 or about a 61 percent chance in a given year. Table 15 indicates the probability of tornados of a specific magnitude.

Table 15 Probability of Tornado in any given year by Intensity for Adams County

Tornado Scale	F0	F1	F2	F3	F4	F5
Number of Reported Tornados*	10	6	2	1	0	0
Probability of Occurrence	32.3%	19.4%	6.5%	3.2%	<1.0%	<1.0%

Source: National Weather Service & NCWRPC – *Based on historical data from 1971 to 2002.

Historic data is again used to estimate potential future dollar losses due to tornado. Estimated damages resulting from various tornados in Adams County range from $0 to $4.5 million. On average, Adams County might expect damages of $404,000 per tornado, however, only two of these 19 historic tornados resulted in damages exceeding $1 million, two others had $250,000, and the rest were $25,000 or less.

Hazard: Winter Storms

Hazard Analysis:
Winter storms can vary in size and strength and include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite and death.

True blizzards are rare in Wisconsin. They are more likely to occur in the northwestern part of the state than in south-central Wisconsin, even though heavy snowfalls are more frequent in the southeast. However, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause the severe blowing and drifting of snow. Heavy snow and ice storms have been part of nearly every winter in Adams County.

History of Winter Storms in Wisconsin:
The NCDC has reported 22 major snow events for Adams County since 1994. All of these storms contained some form of snow, sleet, freezing rain, or slippery road conditions.

Most recently, a March 1, 2002 winter storm produced 6 to 10 inches of snow across southwest and central Wisconsin. Strong north winds of 15 to 25 mph accompanied the snow, causing blowing and drifting.

In February of 2001, Adams County was hit by consecutive ice storms. The first period of freezing rain produced a widespread coating of 1/4 to 1/2 inch of ice, which was followed by 1 to 3 inches of snow accumulation. This caused hazardous traveling conditions, but law enforcement officials reported only minor accidents. The second period of freezing rain affected southwest and central Wisconsin. Even though glazing was widespread, with ice accumulations of 1/4 inch, law enforcement officials reported only minor automobile accidents.

The first winter storm of the 1999 season brought 8 to 13 inches of snow to southwest and central Wisconsin. Strong northeast winds created two to four foot drifts, making many roads impassable. Cooperative observers at Mauston in Juneau County reported the highest snowfall accumulations of 12 to 13 inches.

On March 13,1997, 10 to 20 inches of snow combined with strong winds to produce whiteout conditions in high terrain and open country. Many rural roads were blocked as drifts reached as much as 6 feet high. In La Crosse, 14.3 inches of snow set a new 24 hour snowfall record for the month.

In February of 1994, a slow moving storm system deposited 6 to 16 inches of snow across the southern half of Wisconsin. Brisk winds gusting to 40 mph caused whiteout conditions resulting in numerous accidents. Many schools and businesses closed as well. Snow amounts reported 15.5 inches at Madison and 15 inches at Mauston. Three days later, another deepening snowstorm generated six to ten inches of snow over the southern half of Wisconsin. Hundreds of accidents were reported and schools and businesses closed down.

Vulnerability Assessment:
Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property. Heavy snow or accumulated ice can cause the structural collapse of buildings, down power lines, or isolate people from assistance or services.

The following is a list of things that may be adversely affected by a winter storm. Much of these community assets can be referenced in Part II.

- Infrastructure – operation of emergency services, operation of public facilities and schools
- Utilities – down power and telephone lines
- Transportation – automobile accidents, roadway plowing, salting/sanding
- Residential – roofs
- Businesses –commerce
- Agricultural - livestock

There are no specific areas in the county that have unusual risks. Winter storms cover a broad area and a region-wide concern.

Future Probability and Potential Dollar Losses – Winter Storms:
Based on historical frequency, Adams County can expect 2.4 major winter storms per year on average. In other words the probability is 1.00 or a 100 % chance in a given year.

Estimating potential future losses for winter storms is difficult. Damages and losses are typical minor and widespread. Minor auto accidents and additional snow removal time are typical impacts of winter storms, and such claims are not aggregated or tracked. Winter storms, however, do have the potential to be extremely disastrous, particularly in the case of ice storms. Potential future losses per incident might range from $5,500 (per county average from 1998 ice storm) to $2.3 (per county average from a 1976 ice storm).

Hazard: Drought

Hazard Analysis:
A drought is an extended period of unusually dry weather, which may be accompanied by extreme heat (temperatures which are 10 or more degrees above the normal high temperature for the period). There are basically two types of drought in Wisconsin: agricultural and hydrologic. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels and the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time.

Droughts, both agricultural and hydrologic, are relatively common in the state. Small droughts of shortened duration have occurred at an interval of about every ten years since the 1930's.

History of Drought in Adams County:
Adams County experienced the 1987-1988 drought with the rest of the Midwest. It was characterized not only by below level precipitation, but also persistent dry air and above normal temperatures. Stream flow measuring stations in the state indicated a recurrence interval of between 75 and 100 years. The drought occurred early in the growing season and resulted in a 30-60% crop loss, with agricultural losses set at $1.3 billion for the state. No statistics were available for the amount of crops lost in Adams County, but 52 percent of the state's 81,000 farms were estimated to have losses of 50 percent or more, with 14 percent estimated having losses of 70 percent or more.

The drought of 1976-1977 was most severe in a wide band stretching from north to south across the state. Stream flow measuring stations recorded recurrence intervals from 10 to 30 years. Agricultural losses during this drought were set at $624 million. Adams County was one of 64 counties that were declared federal drought areas and deemed eligible for assistance under the Disaster Relief Act.

Vulnerability Assessment:
Droughts can have a dramatic effect on Adams County. The County has 121,000 acres of farmland with 420 farms according to the Wisconsin Agriculture Statistics Service. With agriculture being a critical sector of the County's economy, droughts have disastrous effects. Even small droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm income. More substantial events can decimate croplands and result in total loss, hurting the local economy.

There are a number of high capacity wells in the County, mostly for crop irrigation. Irrigation can withdraw significant amounts of groundwater. In 1995, the Central Wisconsin Groundwater Data Center reported that 96 percent of all groundwater withdrawal was used for irrigation for Adams County. Not only does irrigation consume large quantities of groundwater sometimes recharging very little back into the ground.

Irrigation can negatively impact the environment by drawing water that naturally goes to aquifers and surface water. Drought can exacerbate the problem when high withdrawal rates versus little precipitation deplete waterbodies and aquifer supplies, therefore decreasing drinking water

supplies, drying streams, and hindering aquatic and terrestrial wildlife. During severe droughts, some wells - mainly private wells - will go dry.

Droughts can trigger other natural and man-made hazards as well. They greatly increase the risk of forest fires and wildfires because of extreme dryness. In addition, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

The following is a list of things that may be adversely affected by a drought. Much of these community assets can be referenced in Part II.

- Infrastructure – municipal water supplies
- Surface water –groundwater reserves, recreation, and wildlife
- Forests
- Agricultural - crops, livestock

The areas most susceptible to drought conditions would be agricultural towns. Agricultural land is scattered throughout the County but largely the Towns of New Haven, Lincoln, New Chester, Jackson, Colburn, and Leola.

Future Probability and Potential Dollar Losses – Drought:
Based on the historic data presented here (frequency of past events), Adams County can expect a drought every ten years on average, which is a probability of 0.10 or a 10 percent chance in a given year. Significant severe drought is somewhat less common, affecting Wisconsin once about every 15 years.

Drought is another hazard lacking good loss figures at the county level. However, a look at aggregate data for the last two major droughts can give some indication of potential impact. The last two major droughts in Wisconsin resulted in losses of $9.6 million (1976-77) to $18 million (1987-88) per county on average.

Hazard: Forest Fires and Wildfires

Hazard Analysis:
A forest fire is an uncontrolled fire occurring in a forest or in woodlands outside the limits of incorporated villages or cities. A wildfire is any instance of uncontrolled burning in brush, marshes, grasslands or field lands. For the purpose of this analysis, both of these kinds of fires are being considered together. The causes of these fires include lightening, human carelessness and arson.

Forest fires and wildfires can occur at any time of day and during any month of the year, but the peak season in Wisconsin is normally from March through November. The season length and peak months may vary appreciably from year to year. Land use, vegetation, amount of combustible materials present and weather conditions such as wind, low humidity and lack of precipitation are the chief factors.

History of Forest Fires in Adams County:
The Wisconsin DNR Fire Dispatch Group in Wisconsin Rapids maintains a database of forest fires for Adams County. From 1999 to 2002, there has been annual average of 58 fires that have burned 83 acres in the County. One of the more substantial fires burned was a 62-acre fire on October 23, 1999.

According to the National Climatic Data Center's database, a wildfire, fanned by gusty winds, charred 158 acres of red pine in the Town of Rome during the early morning of April 13, 1998. The fire necessitated the evacuation of some nearby residences. Nobody was injured and no homes were lost, but there was an estimated property value loss of $80,000.

More fires have been recorded during the drought years like 1976 and 1988.

Vulnerability Assessment:
Adams County has 251,358 acres of forestland, or 57 percent of the area, scattered throughout the County. The potential for property damage from fire increases each year as more recreational and retirement structures are developed on wooded land and increased numbers of people use these areas.

Some of the more critical areas in the County are homes located near industrial forests. These areas are fire prone because of the probability of dried and combustible vegetation. Subdivisions in the northern part of the County are especially vulnerable because of extensive industrial forestland surrounding them.

Rural buildings may be more vulnerable because of lack of access. Access to buildings off main roads is sometimes long, narrow driveways with minimal vertical clearance making it hard for emergency vehicles to combat the fire. These buildings also may not have much of a defensible space because of minimal space between the structures themselves and highly flammable vegetation.

Campgrounds are also a concern because of campfires. Adams County has seven campgrounds. Locations of the campgrounds are shown on Map 15.

Areas that are more vulnerable to fire because of their proximity to industrial forests include the Tri-Lakes area in Rome, along with the Towns of Monroe Big Flats, and Colburn.

Future Probability and Potential Dollar Losses – Forest/Wild Fires:
Forest and wild fires are relatively common occurrences in Adams County. In recent years, there has been an average of 58 fires per year in the County burning 83 acres total on average each year. These fires are typically contained rapidly and remain small, so that each has a minimal impact. More substantial fires are rare in Adams County and include the 62-acre fire in 1999 and the 158-acre fire in 1998.

Because of the relatively small impact of typical individual fires in the County, loss data is not tracked. This makes it difficult to develop an estimate of potential future dollar losses. However, with 58 fires per year, the County should expect some fires to "get out of hand" and likely approach or exceed the $80,000 in damages of the 1998 fire.

Hazard: Hazardous Materials Incidents

Hazard Analysis:
This type of hazard occurs with the uncontrolled release or threatened release of hazardous materials from a fixed site or during transport that may impact public health and safety and/or the environment.

Under the Emergency Planning and Community Right to Know Act (EPCRA), a hazardous material is defined as any chemical that is a physical hazard or health hazard [defined at 29 CFR 1910.1200(c)] for which the Occupational Health and Safety Administration (OSHA) requires a facility to maintain a Material Safety Data Sheet (MSDS). Under EPCRA there is no specific list of hazardous materials. An extremely hazardous substance (EHS) is defined as one of 356 substances on the United States Environmental Protection Agency list of extremely hazardous substances, identified at 40 CFR Part 355.

EPCRA of 1986 also known as SARA Title III, brings industry, government and the general public together to address emergency planning for accidental chemical releases. The emergency planning aspect requires

communities to prepare for hazardous chemical releases through emergency planning. This provides essential information for emergency responders. The community right-to-know aspect increases public awareness of chemical hazards in their community and allows the public and local governments to obtain information about these chemical hazards.

Fixed Facilities

As of January 28, 2002, ten facilities reported that they had an extremely hazardous substance present at any one time in amount equal to or exceeding the chemical-specific threshold planning quantity (TPQ). Of these facilities, four indicated having stances subject to EPA reporting requirements. Most of these substances are for farm use.

The most common EHSs at fixed facilities in the County are:

1. Azinphos-Methyl
2. Anhydrous Ammonia
3. Dimethoate
4. Phosmet

Highway

Trucks carry the bulk of hazardous materials to and through the County. Regular shipments of gasoline, propane, acid and other substances are delivered across Wisconsin. Every roadway is in the County is a potential route for hazardous material transport, but major transportation routes are State Highways 13, 21, and 82 (see Map 3).

On May 20, 2003, a traffic study of Adams County was completed by REI between the time of 7 am and 7 pm. The traffic study only counted trucks with Hazardous Warning Placards. Four intersections were included in the traffic study. The locations of the intersections and the total number of trucks with Hazardous Materials are seen in Table 16.

Table 16 – Number of Trucks Carrying Hazardous Materials at Intersections in County

Intersection	Number of Trucks
State Hwy. 73 & Cty Hwy. G	27
State Hwy. 13 & State Hwy. 21	38
State Hwy. 82 & State Hwy. 13	17
State Hwy. 23, 6th Ln., & Cty. Hwy. B	7

Source REI

Railroad

The Union Pacific Railroad – another mode for the transportation of hazardous material, provides 24 miles of track to Adams County (see Map 3). Although trucks transport most of the hazardous materials in the state and the U.S., rail can carry significantly larger loads of hazardous materials.

There are no statistics available regarding the different EHSs transported annually throughout Adams County, but the potential exists for the transport of any EHS listed on the US EPA's list or OSHA's Toxic and Hazardous Material List. These substances are transported in containers that range from ten-ounce agricultural packages to 196,000 pounds of rail car quantities.

Pipeline

Lakehead Pipeline Company provides pipeline to move petroleum through the County (see Map 6). It runs 31 miles from the northern part of the county to the eastern part.

History of Hazardous Materials Incidents in Adams County:

There have not been any significant reported hazardous material problems involving fixed faculties, roadways, railways, or pipelines. Hazardous materials incidents do occur but on a relatively small scale. They still however can cause considerable property damage and can have a high risk in terms of loss of human life or injury.

Vulnerability Assessment:

Counties in Wisconsin, including Adams County has a Local Emergency Planning Committees (LEPCs) that is set up in accordance with the federal legislation and is responsible for implementation of EPCRA at the county level. The County Emergency Management Director is a member of the LEPC to ensure continuity and coordination of emergency response planning.

To meet the requirements of Title III of EPCRA, the LEPC developed the County Hazardous Materials Response Plan. This plan establishes policies and procedures for responding to hazardous material incidents. The LEPC is required to review, test, and update the Plan every two years. Methods for notification and reporting an incident are outlined in the plan. This plan also works in conjunction of the County Emergency Operations Plan (EOP) where alert to the public, communications, and response procedures are outlined. The plan is tested through tabletop, functional and full-scale exercises and actual response situations.

To provide a high level of hazardous materials response capabilities to local communities, Wisconsin Emergency Management contracts with eight Regional or "Level A" Hazardous Materials Response Teams. The Regional team for Adams County is located at Oshkosh/Appleton. The Regional Response Team may be activated for an incident involving a hazardous materials spill, leak, explosion, injury or the potential of immediate threat to life, the environment, or property. The Regional or "Level A" Teams respond to the most serious of spills and releases requiring the highest level of skin and respiratory protective gear. This includes all chemical, biological, or radiological emergencies.

County or "Level B" Teams respond to chemical incidents which require a lower level of protective gear but still exceed the capabilities of standard fire departments. Currently, there are 36 counties that have a "Level B" Team. Those teams may provide assistance to surrounding counties and are approved by the Local Emergency Planning Committees. At this time, the County contracts with Onyx Special Services.

A concern for the future may be the transportation of nuclear wastes from the Kewaunee Nuclear Power Plant. In 2010, spent nuclear fuel and high-level radioactive wastes from 131 temporary storage sites located in 39 states, including one in Kewaunee, Wisconsin, will be transported to Yucca Mountain in Nevada for permanent repository. Optional routes from Kewaunee may include STHs 21 and 82 through Adams County.

Future Probability & Potential Dollar Losses – Hazardous Materials Incidents: Within Adams County there have been spills that have been cleaned up and brown fields have cropped up that hopefully will be, but there has been no sudden disastrous event to prepare for or mitigate against. So, there is no historic frequency to base a probability for Adams County. Unfortunately, serious disastrous events do take place as witnessed around the state since 1973. In Wisconsin, just between 1995 and 1999, there were 823 HazMat transportation spills, and the number is on the incline. Between 1986 and 2000, there were 28 natural gas pipeline incidents and 35 hazardous liquid pipeline incidents in Wisconsin. With the number of verified trucks carrying hazardous materials, a major industrial railway and a petroleum pipeline moving through the County, the chances appear to be high for a disastrous hazardous materials incident in Adams County.

As with the probability, there is no historic data to base an estimate of potential dollar losses from HazMat incidents. However, based on occurrences statewide, damages range from $95.00 to $1.5 million per incident. The higher end of the range is not impossible in Adams County.

Introduction

As defined by DMA2K, hazard mitigation is any action taken to reduce or eliminate the long-term risk to human life and property from hazards. Part IV of the Adams County All Hazard Mitigation Plan describes the mitigation goals and actions by Adams County and its local units of government for each of the hazards identified in Part III. The intention is to reduce or avoid long-term vulnerability to the identified hazards.

According to FEMA, hazard mitigation refers to any sustained actions taken to reduce or eliminate the long-term risk to human life and property from hazardous conditions.

The hazards are listed in the order given in Part III of this plan. As extensive as this list is of hazards, it does not preclude other natural and man-made hazards that can occur in the County. Furthermore, for those hazards that are listed below, it should be noted that the range of mitigation actions and projects is more extensive than this.

Following each hazard are a list of mitigation goals and possible action projects for Adams County and its local units of government. It was compiled from a number of mitigation plans and reports, government agencies, the County Emergency Management Coordinator, Emergency Management Committee, other County departments, local units of government officials, and suggestions from the public. A summary of the recommended mitigation strategies is provided at the end of this section as Table 17.

Hazard: All Hazards

Goal:

Prepare and protect residents and visitors from all hazards.

Action:

The County should continue to promote an increase use of National Oceanic and Atmospheric Administration (NOAA) weather radios. NOAA Weather Radio (NWR) is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby National Weather Service office. NWR broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day. NWR is not only for thunderstorms, but also for other hazards as well making it a single source for comprehensive weather and emergency information. NWR also broadcasts warning and post-event

information for all types of hazards--both natural and environmental (such as chemical releases or oil spills).

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. Jurisdictions participating in this action will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County should continue to add and update information an Emergency Management Department link off their existing County web site. The web site should contain information describing the types of natural and manmade hazardous disasters in the County and how to respond when a hazard threatens. The site should also contain information on ordinances pertaining to hazards, locations of tornado shelters, and links to such sites as burning and weather conditions.

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. The only directly participating jurisdiction will be Adams County.

Hazard: Flooding

Goal:
Lessen the impact floods have on people, property, and the environment.

Action:
The County and local units of government should incorporate floodplain management in comprehensive planning. Determining and enforcing acceptable land uses through planning and regulation many not prevent inevitable flooding in flood-prone areas, but planning and regulation can alleviate the risk of damage by limiting exposure in such hazard areas.

Participating Jurisdictions:
Lead agency will be Adams County Planning & Zoning with the North Central Wisconsin Regional Planning Commission. Jurisdictions participating in this action will include: NCWRPC, Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New

Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Adams County should acquire new topographical maps for the entire County with two (2) foot contour intervals requiring:

-Ground Control
-Aerial Photography
-Scanning (of Photography into Digital Format)
-Digital Terrain Modeling (DTM)
-Digital Orthophoto Production

Because this an expensive project to undertake, it is recommended that large scale topographic data be developed for the portions of the County that are most densely populated or where the County is aware that development is planned. The cost can also be spread over a number of County departments because of the benefits that it provides to most of the County's functions. Topography information from the County Highway Department can also be utilized for this project.

Grants may be available to reduce the cost of the project by County such as FEMA's Pre-Disaster Mitigation Program (PDM). Other state or federal agencies may provide cooperation in the form of in-kind services or cost sharing. These include DNR, DOT DILHR, NRCS, FEMA, and USGS. The City, Village, and towns will benefit from maps and services to be provided and therefore may agree to partial cost sharing. Private sector entities with significant land holdings in the County may also be willing to participate such as paper and power companies.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Jurisdictions participating in this action will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Adams County should engage a study to update its hydrology data. The existing hydrology data for Adams County is insufficient and out of date, despite the 1990 Flood Insurance Study update. A new study can assist the County in several areas:

- Stormwater data
- Water Quality

- Dam Failure Analysis

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Jurisdictions participating in this action will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Succeeding the update of the County's hydrology data, amendments/ revisions should be made to Flood Insurance Rate Maps (FIRM). By taking the initiative locally to more accurately map problem areas with information not already on FEMA maps, a community can warn residents about potential risks that may not have been anticipated. Upgrading maps provides a truer measure of risks to a community.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Jurisdictions participating in this action will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Following the amendments/revisions to the FIRMs, a GIS coverage should be established to identify individual property owners and businesses located in a 100 year floodplain. A coverage has already been established in Part III of this Plan, however a more sophisticated methodology should be developed with updated FIRM's.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Adams County will be the only directly responsible party

Action:
Upon locating structures in the 100-year floodplain, an aggressive program should be instituted to inform property owners that their properties are located in a 100-year floodplain. Homeowners in the National Flood Insurance Program (NFIP) should be aware what their policy covers. An ongoing public information program must advise the

public and public officials of the potential for all types of flooding, and what preventative measures they can take to mitigate its effect.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Jurisdictions participating in this action will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County, City, and Village should re-evaluate their floodplain zoning ordinances upon the changes that are made with the FIRM maps. Changes that may be considered are adopting ordinances that limit development in the floodplain, limiting density of developments in the floodplain, or requiring that floodplains be kept as open space.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning and Emergency Management. Other responsible parties will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County should survey floodplain property owners for a voluntary buyout or relocation project.

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. The only directly responsible party will be Adams County.

Action:
The City of Adams should develop a stormwater management plan to address stormwater control issues within the City and meet new EPA/DNR regulations.

Participating Jurisdictions:
Lead agency will be City of Adams. The City will be the only directly responsible party.

Action:
Adams County should encourage the Towns of Leola, Monroe, Big Flats, and Colburn to adopt county zoning. These towns should consider the benefits of converting to converting to county zoning.

Participating Jurisdictions:
Lead agency will be Adams County Planning & Zoning. Other responsible parties will include: Adams County, the Towns of, Big Flats, Colburn, Leola and Monroe.

Hazard: Dam Failure

Goal:
Eliminate the loss of life and reduce the risk of property damage in downstream areas that result from a dam failure.

Action:
The Adams County Land Conservation Department (LCD) should develop a dam break analysis and Emergency Action Plan (EAP) for all county owned dams. The LCD Committee has already approved a schedule for this to take place.

Participating Jurisdictions:
Lead agencies will be Adams County Land Conservation and Emergency Management. Adams County will be the only directly responsible party.

Action:
Municipalities affected should identify owners of property that would be inundated from dam failure of Petenwell and Castle Rock and incorporate that information into the EAPs for warning notification.

Participating Jurisdictions:
Lead agencies will be affected Towns. Jurisdictions participating in this action will include: Adams County, and the Towns of Dell Prairie, Quincy, Springville and Strongs Prairie.

Hazard: Severe Thunderstorms

Goal:
Minimize the threat to human life and property damage caused by associated high wind and lightening.

Action:
The County should continue to promote the planting of windbreaks to protect farmsteads, buildings, and open fields from high winds. Established trees and shrubs can slow wind on the downwind side of a windbreak for a distance of 10 times the height of the trees. The windbreaks can also reduce soil erosion, act as snow fences, provide wildlife food and cover, and offer a number of other benefits.

There are a number of resources area farmers use to help install and pay for windbreaks. Both the Central Wisconsin Windshed Partnership and the County Land and Water Conservation Department provide assistance to help establish windbreaks. Windbreaks can also be established through the Conservation Reserve Program (CRP), Conservation Enhancement Reserve Program (CREP), Conservation Security Program (CSP), and Environmental Quality Incentive Program (EQIP) from the USDA Natural Resource Conservation Service (NRCS).

Participating Jurisdictions:
Lead agency will be Adams County Land Conservation. Adams County works cooperatively with NRCS on this activity.

Action:
A review of local building codes should be conducted to determine if revisions are needed to improve the structures ability to withstand greater wind velocities. The building code provisions may include requirements for construction methods that employ cross-bracing, anchoring of walls to foundation, and anchoring roof rafters to walls (also mitigates tornado risk) and measures to provide wind protection and retrofits for vulnerable features (windows, garage doors, patio doors, double-wide entry doors, siding, and bracing for walls and rafters). A document was created by FEMA and WEM to help to provide adequate and inexpensive wind mitigation measures to local officials, residents, and business owners prevent future wind damages to residential, commercial, and public structures. This document (provided on the WEM website) should be referenced when making changes to buildings codes.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning, City of Adams, and the Towns of Dell Prairie, Lincoln and Rome. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Since the County, particularly the Town of Rome, provides a variety of recreation activities, public awareness of proven lightening safety guidelines to reduce risk should be promoted. Such measures as constructing signs to inform people when to get out of the water or off a golf course when there is lightening can be taken.

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Hazard: Tornados

Goal:
Protect health, safety, and welfare of county residents and visitors. Along with future loss of property from tornados

Action:
The County and the local units of governments should identify buildings that will provide protection to the public in the event of a tornado. As an example, the pastor at the Trinity Lutheran Church in Arkdale opens the doors when a tornado warning is issued. There are a number of buildings in the County that can accommodate people during a tornado. The basement at the City Hall in Adams for example provides ample room.

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
Upon identifying existing buildings that could provide protection, the County and its local units of governments should identify areas that are deficit in tornado shelters. Concrete safe rooms should be constructed in these areas. Structures available to the public during tornado warnings should be publicized by a number of sources such as area newspapers, signs, county maps, and the County web site.

Funding for the construction of safe rooms could be made available through the Wisconsin Department of Commerce's Committee Development Block Grant (CDBG).

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County should require and promote construction standards and techniques. To strengthen public and private structures against severe wind damage, communities can require or encourage wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles. Also, architectural design can make roofs less susceptible to uplift.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning, City of Adams, and the Towns of Dell Prairie, Lincoln and Rome. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County should encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors. Using these devices can reduce the risk to mobile and manufactured home damage.

Participating Jurisdictions:
Lead agencies will be Adams County Planning & Zoning, City of Adams, and the Towns of Dell Prairie, Lincoln and Rome. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Hazard: Winter Storms

Goal:
Create safety awareness to citizens and travelers of Adams County to protect them during and after winter storm events.

Action:
The County should encourage the development of snow fences for public safety. Using snow fences or "living snow fences" (rows of trees or other vegetation) can limit blowing and drifting of snow over critical roadway segments. As mentioned previously under "Thunderstorms", assistance can be provided by the County Land and Water Department and NRCS to develop windbreaks. Windbreaks would be advantageous to the County Highway Department and towns to prevent blowing and drifting on roadways.

Participating Jurisdictions:
Lead agencies will be Adams County Land Conservation and Highway Department. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action:
The County should promote winter hazards awareness, including home and travel safety measures, such as avoiding travel during winter storms. If travel cannot be avoided, having a shovel, sand, warm clothing, food, water, and back-up heating system should be encouraged to have in vehicles.

Participating Jurisdictions:
Lead agency will be Adams County Emergency Management. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Hazard: Drought

Goal:
Minimize crop loss while maintaining water supplies during times of drought.

Action:
The County should encourage farmers that irrigate to use the Wisconsin Irrigation Scheduling Program (WISP). This research-based program assists growers in determining frequency and amounts of irrigation throughout the growing season; it can be extremely helpful during a drought.

Participating Jurisdictions:
Lead agencies will be Adams County Land Conservation and Adams County UW-Extension. Adams County will be the only directly responsible jurisdiction.

Action:
The County should be prepared on how to inform farmers during times of drought. This could include feed assistance or financial assistance programs and managing crops and livestock during drought conditions.

Participating Jurisdictions:
Lead agencies will be Adams County Land Conservation and Adams County UW-Extension. Adams County will be the only directly responsible jurisdiction.

Action:
The County should inform farmers on the advantages/disadvantages of crop insurance for preserve economic stability for farmers during a drought.

Participating Jurisdictions:
Lead agencies will be Adams County UW-Extension with FSA. Adams County will be the only directly responsible jurisdiction.

Hazard: Forest Fires and Wildfires

Goal:
Protect the safety and property of residents from forest and wildfires

Action:
The County and DNR should continue to make outreach efforts to homeowners on protecting their homes and structures from wildfires. Since Adams County is mostly rural with many industrial woodland parcels, emphasis should be placed on construction and establishing defensible areas around structures. Roofs and exterior siding should be made of ignition-resistant materials. At least 30 feet should be left between homes and surrounding combustible vegetation. Outreach efforts can exist in the

form of web sites, local newspaper articles, and pamphlets to homeowners.

Participating Jurisdictions:
Lead agencies will be Adams County Emergency Management with WisDNR. Adams County will be the only directly responsible jurisdiction.

Action:
Local fire departments should provide more training for larger fires.

Participating Jurisdictions:
Lead agencies will be Adams County Emergency Management and fire districts serving Adams County. Other participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Hazard: Hazardous Materials Incidents

Goal:
Protect people and natural resources from adverse affects of hazardous material incidents.

Action
The County should develop a Level B Emergency Response team to respond to hazardous spill situations. Several factors support this such as the density of traffic carrying hazardous materials over the major transportation routes of State Highways 13, 21, and 82, the pipeline that delivers petroleum through 31 miles of the County, and a railway that crosses along several communities and across some major rivers. Establishing a local Level B Team will provide more immediate response to incidents that require hazardous material spills.

Participating Jurisdictions:
Lead agencies will be Adams County Emergency Management and fire districts serving Adams County. Other participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

Action
The County should prevent or reduce hazardous material exposure by separation and buffering between industrial areas and other land uses. Industrial areas should be located away from schools, nursing homes, hospitals, and other facilities with large and vulnerable populations.

Participating Jurisdictions:
Lead agency will be Adams County Planning & Zoning. Participating jurisdictions will include: Adams County, City of Adams, Village of Friendship and all Towns including: Adams, Big Flats, Colburn, Dell Prairie, Easton, Jackson, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, Richfield, Rome, Springville and Strongs Prairie.

TABLE 17 - Summary of Mitigation Strategies

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Comments
All Hazards	Continue to promote the increase use of National Oceanic and Atmospheric Administration (NOAA) weather radios	Covered by Dept annual budget	EM Dept	On-going	
	Continue to add/update Emergency Management Department link off their existing County web site	Covered by Dept annual budget	EM Dept	On-going	
Flooding	Incorporate into local comprehensive planning process	Covered by comp plan grant	P&Z Dept/NCWRPC	2003-2006	Comprehensive plan currently being developed
	Acquire new topographical maps for the entire County with two (2) foot contour intervals	Cost to be determined	P&Z Dept	2005	May wish to start with areas that are projected to be developed
	Engage a study to update its hydrology data	Cost to be determined	P&Z Dept	2007	Coordinate with FEMA
	Amendments/ revisions should be made to Flood Insurance Rate Maps (FIRMs)	Cost to be determined	P&Z Dept	2009	
	Establish a GIS coverage and database to identify individual property owners and businesses located in a revised 100 year floodplain	Covered under Dept budget	EM Dept/ P&Z Dept	2009	
	Inform property owners of properties that are located in the revised 100-year floodplain	Covered under Dept budget	EM Dept/ P&Z Dept	2009	
	Re-evaluate floodplain zoning ordinances	Covered by Dept annual budget	P&Z Dept	2010	
	Survey floodplain owners on interest in voluntary buyout and relocation projects.	Covered by Dept annual budget	EM Dept	Pending on new FIRMs	FEMA's PDM & FMA grants are potential funding sources for buyout
	Develop a Stormwater Management Plan for the City of Adams	~$30,000	City of Adams	2006	
	Encourage the Towns of Leola, Monroe, Big Flats, and Colburn to adopt county zoning	Cost under Dept budget	P&Z Dept	on-going	Towns presently have no zoning
Dam Failure	Develop a dam break analysis and Emergency Action Plan (EAP) for all county owned dams	Cost to be determined	LCD	2005	Presue possible FEMA PDM grant for this project
	Identify owners of property that would be inundated from dam failure of Petenwell and Castle Rock. Incorporate those into the EAPs for warning.	Cost to be determined by extent of project	Strongs Prairie, Quincy, Springville, Dell Prairie	2005	WI River and Power should provide assistance

Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Comments
Severe T-Storms	Promote the planting of windbreaks to protect farmsteads, buildings & open fields from high winds	Costs vary	LCD and NRCS	In place and ongoing	Utilize number of different sources for cost-sharing
	Enforce local building codes to improve structures' ability to withstand greater wind velocities	Covered under Dept budget	P&Z Dept	2004	
	Promote public awareness of proven lightening safety guidelines to reduce risk	Costs vary	EM Dept	2004	
Tornadoes	Identify buildings that will provide protection to the public in the event of a tornado warning	Covered under EM Dept/MCD budget	EM Dept/MCDs	2004	
	Identify and construct tornado shelters in areas where deficient	Cost Vary	EM Dept/MCDs	On-going	Utilize Department of Commerce's CDBG for funding assistance
	Require and promote construction standards and techniques	Covered under budget	P&Z Dept	2004	
	Encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors	Covered under Dept budget	EM Dept/P&Z Dept	2004	
Winter Storms	Encourage the development of snow fences	Costs vary	Hwy Dept/LCD	On-going	As grants become available
	Promote winter hazards awareness, including home and travel safety measures	Covered under Dept budget	EM Dept	On-going	
Drought	Encourage farmers that irrigate to use the Wisconsin Irrigation Scheduling Program (WISP)	Covered under Dept budget	UW-Ext. Dept/LCD	2004	
	County should be prepared how to inform farmers during times of drought	Covered under Dept budget	UW-Ext. Dept	On-going	
	Inform farmers on purchasing crop insurance	Covered under Dept budget	UW-Ext. Dept/FSA	On-going	
Forest Fires and Wildfires	Continue to provide outreach efforts to homeowners on protecting homes and structures from wildfires	Costs vary	EM Dept/DNR	On-going	"Firewise" program, kids' fair, newspaper campaigns
	Provide ample training for volunteer fire fighters for larger fires	Covered under Dept budget	Local Fire Depts	On-going	
Hazardous Material Incidents	Develop a Level B Emergency Response team to respond to hazardous spill situations	$10,000	EM Dept	2005	Utilize the HAZMAT grant
	Prevent or reduce hazmat exposure by separation & buffering between industrial and other land uses	Covered under Dept budget	P&Z Dept	2004	

EM Dept = County Emergency Management Department
FSA = Federal Farm Service Agency
LCD = County Land Conservation Deparment
P&Z Dept = County Planning and Zoning Department

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Part V of the Adams County All-Hazard Mitigation Plan describes the plan adoption, implementation, and evaluation and maintenance.

Plan Adoption

The adoption of the Adams County All-Hazard Mitigation Plan lends itself to serve as a guiding document for all local government officials. It also certifies to program and grant administrators from the FEMA and WEM that the plan's recommendations have been properly considered and approved by the governing authority and the jurisdiction's citizens. Finally, it helps to ensure the continuity of mitigation programs and policies over time because elected officials, staff, and other community decision-makers can refer to the official document when making decisions about the community's future.

Before adoption of the Plan by the incorporated areas, the Plan must be sent to the state and federal level to verify that all DMA2K requirements are met. Once a draft of the Plan has been completed, it is submitted to the State Hazard Mitigation Officer (SHMO) at the state level at WEM. Previous drafts of the Plan have already been reviewed prior to this submittal. The SHMO will determine if the Plan meets DMA2K and/or other state program requirements. Upon approval of the draft by WEM, the SHMO is responsible for showing the Plan to the FEMA Region V Office for review.

After review and approval by FEMA, the Plan must be formally adopted by Adams County and its incorporated areas (County, City and Village) by a resolution. Incorporated communities that do not adopt the Plan cannot apply for mitigation grant funds unless they opt to prepare, adopt, and submit their own plan. According to FEMA Region V, unincorporated areas (towns) that do not have to formally adopt the plan. Adoption of the plan gives the jurisdiction legal authority to enact ordinances, policies, or programs to reduce hazard losses and to implement other mitigation actions. Resolutions of adoption are contained in APPENDIX B.

Plan Implementation

Administrative Responsibilities

Once the Plan has been approved, stakeholders should be informed. The County Emergency Management Coordinator should distribute copies to these stakeholders. The County should make the Plan available to the public by linking the Plan on their web site.

During implementation of the Plan, the County Emergency Management Coordinator and Committee should take the role as overseer. As the developers of the Plan, the Coordinator and Committee should monitor its progress. They will help ensure that the Plan is used and not sidetracked by political or personal concerns, and hold the local governments and departments accountable for implementing the actions described in Part IV. It is also their role to reference the Plan when evaluating and making political decisions.

Along with monitoring the progress of the action projects, the Coordinator and Committee should also work to secure funding to implement the Plan. State and federal agencies, nonprofit organizations, and foundations continually make grants available. Emergency Management to should research these grant opportunities to determine eligibility for the County and its local units of government.

When implementing this Plan, the Emergency Management Committee and staff team should consider innovative ways to involve active participation from nonprofit organizations, businesses, and citizens to implement the Plan. The relationship between these groups will result in greater exposure of the Plan and provide greater probability of implementation of the action projects listed.

The role of department administrators, elected officials, local administrators are to ensure that adopted actions from Part IV are considered into their budgets. It is understood that projects may not be carried out as they are scheduled in Part IV due to budget constraints. However, since many of these action projects are considered an investment in safeguarding the publics' health, safety, and property, they should be carefully considered as a priority. There is also the use of fees, taxes, bonds, and loans to finance projects if there is proper state enabling legislation, local authority, and enough political will.

Coordination with Comprehensive Plans

As Adams County and its local units develop their comprehensive plans, incorporation of the All-Hazard Mitigation Plan is highly recommended. Wisconsin comprehensive planning law includes a detailed description of nine elements. The following concepts should be considered when incorporating the All-Hazard Mitigation Plan into the nine elements of the County and local comprehensive plans.

- *Issues and Opportunities Element*– a summary of major hazards local government is vulnerable to, and what is proposed to done to mitigate future losses from the hazards.

- *Housing Element* – an inventory of the properties that are in the floodplain boundaries, the location of mobile homes, recommendation on building codes, shelter opportunities, and a survey of homeowners that may be interested in a voluntary buyout and relocation program
- *Transportation Element* – identify any transportation routes or facilities that are more at risk during flooding, winter storms, or hazardous material spills
- *Agricultural, Natural Resources, and Cultural Resources Element* – identify the floodplains and agricultural areas that area at risk to hazardous events. Incorporate recommendations on how to mitigate future losses to agricultural areas.
- *Economic Development Element* – Describe the impact past hazards have had on County and municipal business
- *Intergovernmental Cooperation Element* - identify intergovernmental police, fire, and rescue service sharing agreements that are in effect, or which may merit further investigation, consider cost-sharing and resource pooling on government services and facilities.
- *Land Use Element* - describe how flooding have impacted land uses and what is being done to mitigate negative land use impacts from flooding; map and identify hazard areas such as floodplains, hazardous materials areas, and soils with limitations.
- *Implementation Element* – have action plans from this Plan implemented into comprehensive plans.

Promote Success of Identified Projects

Upon implementing a project covered by this Plan, it is important to promote the accomplishment to the stakeholders and to the communities. This will help inform people that the Plan is being implemented and is effective.

Plan Evaluation and Maintenance

Planning is an ongoing process. Because of this, this document should grow and adapt in order to keep pace with growth and change of the County and its local jurisdictions. DMA2K requires that local plans be evaluated and updated at least every five years to remain eligible for assistance.

It has been decided by the Committee that all parts of the Plan be evaluated and updated on an annual basis. Within this period, the Adams County Emergency Management Coordinator should evaluate incoming information in the Plan to prepare for the revisions. It is recommended that the Committee discuss evaluation and revisions to the Plan one year from

its adoption month. The Emergency Management Coordinator is encouraged to consult/coordinate with the NCWRPC at the time of revision.

It has also been decided by the Committee that the Plan be evaluated and revised following disasters, to determine if the recommended actions are appropriate given the impact of the event. This risk assessment (Part III) should also be revised to see if any changes are necessary based on the pattern of disaster damages. The Emergency Management Committee must approve all additions and updates to the plan.

The Committee should be sure to keep all stakeholders and the public in the County informed of the progress of the projects. When looking for involvement, a survey or open comment meeting should be conducted every five years.

Appendix A – Local Unit Survey

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Mary Gruber, Coordinator
Adams County Emergency Management
400 Main St., P.O. Box 144
Friendship, WI 53934-0144
608-339-4248
608-339-4299(fax)

MEMORANDUM

TO: Towns, Village of Friendship, and City of Adams public officials in Adams County; County department administrators; and government agencies.

FROM: Mary Gruber

DATE: April 3, 2003

RE: Adams County All-Hazard Mitigation Plan Survey

Adams County has received a grant through The Federal Emergency Management Agency (FEMA) to complete an All-Hazard Mitigation Plan to protect the health and safety of residents from the impacts of hazards, and minimize and prevent damages caused by natural and man-made adverse events. Each unit of government must participate and adopt the plan if they wish to continue to be eligible for future federal and state disaster assistance.

Adams County is being assisted by the North Central Wisconsin Regional Planning Commission (NCWRPC). The NCWRPC is currently in the process developing the plan and is seeking information from public officials of all units of government, selected county departments and government agencies. The enclosed survey has been created for this purpose.

Keep in mind that this hazard mitigation planning program is separate from the county comprehensive plan effort you will be hearing more about in the near future.

Please complete and return the survey in the enclosed envelop (for those who are not in the courthouse) to me by June 1, 2003. Since this is a plan that concerns the safety, health, and property of the county's residents, your information for this survey is critical. A public informational meeting is tentatively planned in July. You, along with the public, will have an opportunity to view a proposed draft and voice your opinion on the plan. If you have any questions prior to this meeting, please feel free to call the NCWRPC at 715 849-5510 or myself at 608-339-4248.

Adams County
All-Hazards Mitigation Plan Survey

Unit of government/Department Name:_____

1. What hazards (natural or man-made) are a concern and should be addressed in the Adams County All-Hazard Mitigation Plan? (please check all that apply)

   Air Transportation Incidents
   Cold Waves
   Dam Failures
   Droughts
   Floods and Flash Floods
   Forest Fires and Wildfires
   Hazardous Material Incidents
   Heat Waves
   Landslides
   Lightening
   Prison Disturbances
   Terrorism
   Tornadoes
   Winter Storms (heavy snow, freezing rain)
   Other_____

2. What projects has your unit of government/department completed to minimize the risks of future natural hazards? (i.e. acquired land/structures in floodplains, dam/levee maintenance, constructed tornado shelters)

   What benefits have these projects provided?

3. Please indicate what additional mitigation projects need to be done, and indicate the priority of doing them.

4. Please indicate any of the following plans, reports, or policies your unit of government/department has that are relevant to natural or man-made hazards:

   Stormwater plan/report/policy statement
   Land use plan/report/policy statement
   Flood plan/report/policy statement
   Other_____

   Names of documents and year prepared

   _____
   _____
   _____
   _____

5. What goals, objectives, and recommendations would you suggest for the county should consider in hazard mitigation planning?

   Incorporate hazard planning into comprehensive plans and land use ordinances
   Bury electric and telephone lines, where possible, to resist from severe winds, lightening, ice, and other hazards
   Develop an acquisition/relocation program to purchase and remove structures in floodplain areas
   Develop fund assistance for property owners wishing to flood proof their homes
   Update the 100-year floodplain maps and end new building in floodplains
   Strengthen stormwater ordinances to control runoff from new developments
   Construct shelters in vulnerable locations in the county to protect from tornadoes, extreme weather, and other hazards

Other suggestions:

_____
_____
_____
_____

6. Does your unit of government/department have records or other documentation on natural or man-made disasters?

   Check if yes

7. Please indicate specific areas that were noticeably affected by natural or man-made disasters in the past. Include notes on the types of problems experienced in each area.

   Roads
   Streets
   Culverts
   Bridges
   Water and sewer infrastructure and facilities
   Parks
   Public buildings
   Mobile homes
   Residential (besides mobile homes)
   Businesses/churches
   Crops
   Other

8. Please describe areas in your municipality that became isolated and inaccessible during or after a disaster where access was hampered?

9. Is there anyone else we should follow up with that would provide assistance to hazard mitigation planning?

   Name:_____
   Number:_____

10. Please feel free to comment on any other related issues to this plan.

THANK YOU FOR YOUR INFORMATION!

Appendix B – Resolutions of Plan Adoption

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RECEIVED

MAR 2 4 2004

NORTH CENTRAL WISCONSIN
REGIONAL PLANNING COMMISSION

Resolution no. 30 -2004

INTRODUCED BY: Emergency Management Committee.

INTENT & SYNOPSIS: Adopting the Adams County All Hazards Mitigation Plan.

FISCAL NOTE: No fiscal impact.

WHEREAS, Adams County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, under taking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save tax payer dollars; and

WHEREAS, an adopted all hazards mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, Adams County participated jointly in the planning process with the other local units of government within the County to prepare an All Hazards Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Adams County Board of Supervisors, hereby adopts the Adams County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Adams County Emergency Management Department will submit, on behalf of the participating municipalities, the adopted All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval.

Dated this ~~17th~~ 16 of March 2004.

Bill Grannan   Charles Hill

Joyce Kersenlohr

Adopted ✓
Defeated ___ by the Adams County Board of Supervisors this 17th of March 2004.
Tabled ___

Cindy Phillippi, Deputy
County Clerk

Bill Grannan
County Board Chair

State of Wisconsin
County of Adams
This document is a full, true and correct copy of the original on file and of record in my office and has been compared by me
Attest March 17, 20 04
Cindy Phillippi
Deputy County Clerk